RAILROAD GAZETTE

FRIDAY, JUNE 3.

NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

Meetings Next Week.—Chicago, Burlington & Quincy; Fort Worth & Rio Grande; Minnesota & Northwestern; St. Paul & Sioux City.

Elections.—Atchison, Topeka & Santa Fe, George L. Sands, General Superintendent.—Atlantic & Pacific, J. H. Scott, Superintendent.—Boston, Concord & Montreal, E. H. Rollins, President.—Chicago, Kansas & Western, George L. Sands, General Superintendent.—Manchester & Lawrence, Charles A. Sinclair, President.—Meriden & Waterbury, Charles Dickinson, President.—Rapid City, Wyoming & Western, E. B. Chapman, President.—St. Louis & San Francisco, E. F. Winslow, President.—Shreveport & Arkansas, S. W. Fordyce, President.

Personal.—Died: Julius Wadsworth.

New Companies Organized.—Arkansas, Kansas & Colorado is incorporated in Kansas.—Atchison, Topeka & Santa Fe files articles in Illinois.—Chicago, Kansas & Texas files charter in Kansas.—Danville & Seaboard obtains charter.—Gainesville, Pilot Point & Western obtains charter in Texas.—Illinois Valley is incorporated in Illinois.—Junction City, Hope & McPherson Air Line is incorporated in Kansas.—Kentucky Central, as reorganized, files articles.—Peekskill Valley is incorporated in New York.—Rapid City, Wyoming & Western files articles in Dakota.—St. Joseph Circle is incorporated in Missouri.—Shreveport & Arkansas is organized in Louisiana.

Changes and Extensions.—*Arizona:* Mineral Belt road is completed 16 miles from Flagstaff.—*Dakota:* St. Paul, Minneapolis & Manitoba is completed from Rutland to Glendale. Aberdeen, Bismarck & Northwestern will build from Ordway to Bismarck.—*Georgia:* Marietta & North Georgia will be c anged to standard gauge and extended.—*Kentucky:* Kaskaskia, St. Elmo & Southern is now building.—*Maine:* Camden, Rockland & Rockport institutes survey.—*West Virginia:* Work is begun on the Black Diamond.

Leases and Sales.—Dayton & Ironton and the Dayton & Chicago are consolidated.—St. Louis, Fort Scott & Wichita is sold.—St. Louis & Western is sold.

Traffic.—Anthracite coal shipments for the week ending May 28 show an increase of 39.7 per cent. as compared with corresponding week last year; bituminous shipments show increase of 53.8 per cent.; coke, for week ending May 21, shows decrease of 86.3 per cent. Cotton receipts, interior markets, for week ending May 27, show decrease of 69.8 per cent., as compared with corresponding week last year; shipments show decrease of 67.1 per cent.; seaport receipts show decrease of 57.1 per cent.; exports a decrease of 70.0 per cent.; cotton in sight is less than at same period last year by 42.1 per cent.

Miscellaneous.—Serious train accident on Pennsylvania Railroad.

Contributions.

Carload Rates.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Mention has been made of the German tariff. In connection with that the following should be considered:

(a) So far from professing "to put large and small shippers on an equality," is not the contrary idea, that one man is *not* as good as another, the rule in Germany?

(b) More stress should be laid upon the fact that the German tariffs have a special classification for freight in five-ton lots as well as in full carloads of ten tons, while our minimum is twelve tons. In comparing percentages in Germany and in the United States would it not be fairer to compare the rate for ten tons with the rate for five tons (20 per cent. advance) rather than the ten tons with the parcels rate? This more especially because

(c) One of the results of carloads in Germany is the organization of "forwarders," who gather freight from small shippers and take advantage of the five or ten ton rate, charging owners of the freight an advance to cover their expenses and profits. Good authority states that the bulk of the parcels business is now done by these forwarders. Is this healthy transportation?

"If the eastern manufacturer cannot live with a rate paying cost of transportation and profit, he must succumb to the misfortune of his location." What is this cost and profit on west-bound traffic? I quote again from your editorial, "nor could lines afford such rates going west were it not that many cars go west empty which it is better to have filled with freight at almost any price." This is substantially my position. Remembering that the tonnage east ward is three times the volume of western traffic, and considering how much expense is involved in moving these empty cars westward, which would be increased but little were the cars filled, it will be seen that the limit of profit on west-bound shipments has been by no means reached. I venture to prophesy that this distinction between east and west-bound business will grow more pronounced as time goes on, and that it will force itself upon the lines west of Chicago also. The bearing of all this upon the carload question is (1st) that the forcing of the general carload feature of the east-bound classification upon the west-bound was doubtful policy; and (2d), that in putting such great differences between carloads and less on sugar, molasses, coffee, canned goods and other staples, where no such differences existed in the four schedules combined, the committee carried a doubtful policy beyond the bounds of justice.

I do not interpret the Inter state law as intending to introduce a mileage basis for rates, but that its tendency is toward equalization of rates for competing products and markets.

The suggested reason for carload rates upon certain articles, and not upon others, that the former are shipped in large quantities and the latter in small, does not seem to be always applicable. Boots and shoes and butter have but one rate. If we say that low value determines the question, then why not a carload rate upon rice, tobacco and cheap cotton goods?

A more difficult part of the subject is the matter of cost of service, though your estimate of 30 or 40 per cent. increase in cost of small lots is much too large. The percentage on groceries in the Southwestern territory is only 11 per cent. I have already referred to the west-bound traffic as profitable at low rates which would not be good railroading eastward. I think this consideration alone is enough to show that the charges upon small lots of freight westward bound should not be higher than carloads. We ought to say that cost of service is reduced for carloads only when there is some saving in expense over small lots. If sugar, for example, could be handled like lumber or grain on side tracks or in elevators, the saving could be calculated, but for nearly all house freight there is exactly the same terminal expense no matter what the quantity. Hence the fact that station expenses are heavy in large cities may be explained without reference to the separate ownership of house freight, since the same land and labor is required. There is of course an extra expense in delivering way freight from a peddling train, but under our modern system of sending full loads to distributing or division points this is reduced to a minimum. There is also theoretically some additional expense for clerical work in the way billing and auditing departments, but it is comparatively insignificant. How many clerks could be dispensed with if every shipment were a car-load? Very few. And what proportion of the whole expense would be saved? Very small. I wish we had some statistics upon this clerical question, for I am sure they would show that the differences in our new classification between car-loads and less are on most articles far more than any differences in cost of service. Railroad men object, and very properly, to any theory which bases transportation rates upon cost of service; should not the same objection lie against the putting of too much stress upon this same theory in regard to less than car-load rates? We may properly ask this question in view of the fact that previous tariffs have not always made the distinction in question. The east-bound classification in which we should most expect to find the car-load principle, made the low rate of 25 cents per hundred pounds from Chicago to New York on such articles as earth paint and iron in small lots, with no other rate for carloads. Is not this and many other instances which might be mentioned, sufficient to show that in practice the additional cost of small lots, if any, was generally disregarded?

But in any case the cost of service is only one out o very many considerations bearing upon the question. The interests of the consumer, the small trader, and the thinly settled community, the injury which would be done to a full and free competition, combine to make the charging of a higher rate for small lots than for carloads of miscellaneous freight a matter of doubtful policy for the carrier or for the merchant from either a political or commercial point of view. JUDEX.

[We have already given so much space to this matter that we shall not undertake to discuss these arguments at length. We think that our correspondent overlooks the large item of expense due to delay in handling; a thing which affects most forcibly the question of securing parcels freight westward. It is precisely for the sake of utilizing car space that back loading rates are resorted to, and any delay in handling defeats the economy of car space by lessening the rapidity of car movement.

The remarks about the German tariff are in many respects just. But the first point is wrong. The argument for state railroads was, that they would be able to secure equality. They have failed to do it; and the fact that the German railroad administration recognizes the failure only throws into stronger relief the fact that they did not succeed in carrying out those ideas of public policy on which stress was laid in the German Parliament and in the press.—EDITOR RAILROAD GAZETTE.]

Welded Eye Bars.

BALTIMORE, May 28, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of May 13 you publish a letter from Mr. J. W. Schaub which is presumably intended for a reply to a letter from Mr. J. L. Randolph, in regard to the use of welded eye bars in bridges built by the Baltimore & Ohio Railroad. It seems that Mr. Schaub has not only written hastily, but strained a point to appear in your columns upon the subject of "Welded and Upset Eye Bars."

Mr. Randolph's letter was not written as a defense of welded eye bars as being superior to any other make of bar. Nor did he undertake to settle the question as to methods of inspection, but to show that although this company did use welded eye bars, every precaution was taken to insure a safe bar, and one that would be ready to meet any strain that would be likely to come upon it, and to do away with the impression conveyed in Mr. Smith's letter that the B. & O. R. R. used a welded bar that at any time might cause just such a catastrophe as at Otter Creek.

Does Mr. Schaub suppose that the Otter Creek disaster would have happened if the bars that went into that bridge had been previously strained to 20,000 lbs. per square inch, without injury?

Does Mr. Schaub know enough about bridge building to know that if a bridge is strained to some thousands of pounds per square inch less than twenty thousand, it is usually considered a dangerous structure?

If a welded bar performs all the work that is imposed upon it, what more can be desired? The B. & O. R. R. can bear witness that for thirty-five years welded bars have faithfully done their work under constantly increasing loads, without an accident.

In regard to inspection, to state that a close examination of a bar while under a strain is no better than a *most casual* inspection, is, to say the least, an absurdity. And wherein it is more scientific to test to destruction one bar to prove the quality of workmanship of another, I fail to see. The testing of a certain number of bars from a lot is certainly very desirable to arrive at the general ultimate strength and elasticity, but it should not be done to the exclusion of straining and inspecting each individual bar.

G. B. HAZLEHURST, Asst. Eng., B. & O. R. R.

Heating Feed Water for Locomotives.

TO THE EDITOR OF THE RAILROAD GAZETTE:

To heat a pound of water from a temperature of 50° and convert it into steam at a working pressure of 150 lbs. 1,175 heat units must be imparted to it (a heat unit being what will raise its temperature one degree), or as much as would increase its temperature 1,175 degrees if it did not change into steam, since nearly a thousand degrees of heat disappear by this change of molecular condition. Steam at a working pressure of 150 lbs. is heated only some 45° more than exhaust steam at the atmospheric pressure, though, on account of that great pressure, the temperature shown is 363°, so that only $\frac{45}{1175}$, or less than four per cent. of the heat imparted, is converted into work, and over ninety-six per cent. is carried away by the exhaust steam.

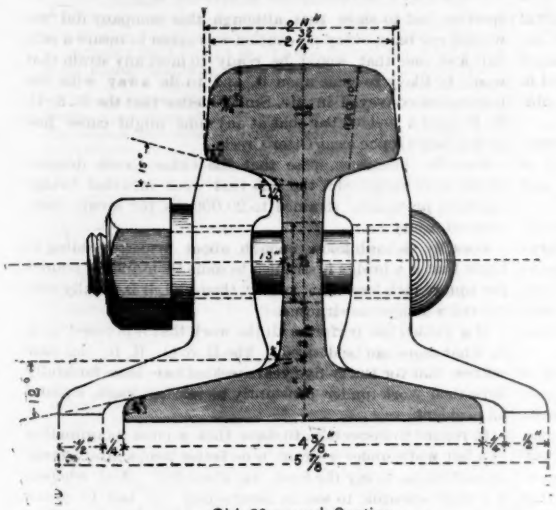
If without other loss this waste heat can be utilized to heat the feed water from 50° to 200° we have accomplished $\frac{150}{1175}$, or say thirteen per cent. of the whole work of making steam. This is about the percentage of saving in fuel which may be expected from the use of a good feed-water heater in a stationary engine that has boiler room enough, large grate surface, a natural draught and the other most favorable conditions for burning the fuel and using the steam economically. An engine that has too small a boiler, or that is in any way overworked will receive much more benefit.

The locomotive at best makes steam with less economy than the stationary engine. Its boiler is necessarily small for the great amount of steam used, the fire is forced beyond the possibility of economical combustion, the gases are carried into the tubes only half burned, and out of them before they have given up their heat, and much of the coal is merely coked and broken up, hundreds of pounds accumulating in front, not unfit to be burned again, and much more sifting through the cars and blackening the road-bed. The exhaust that produces so fierce a draught requires a great expenditure of force to drive it so violently from the cylinders, and what is available for productive work is thereby greatly diminished.

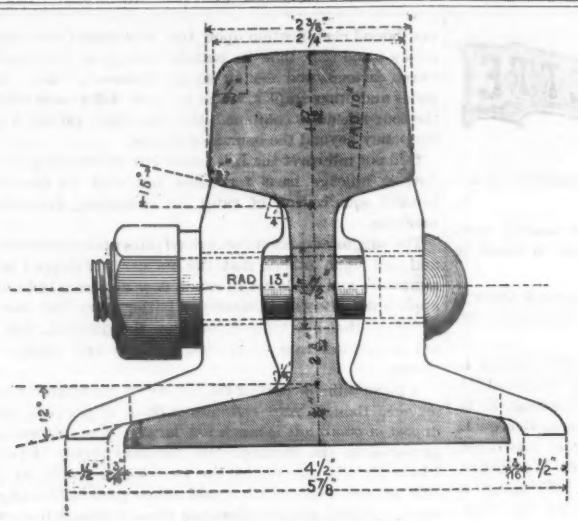
The conditions under which steam is made and used in a locomotive are therefore much less favorable to economy than those that obtain in a stationary engine, and the need of such help as a good heater can give is greater. If one-eighth of the whole heating required can be effected by the waste heat of the exhaust we have practically made the boiler one-seventh larger, since it has to accomplish only seven-eighths as much, and therefore have secured, besides the one-eighth directly saved, a very considerable increase of economy, by arranging to make the required steam with a slower fire, to give time for the gases and fine coal to burn before entering the flues, and time in the flues to communicate the heat generated to the water, and, since a softer exhaust now suffices, have taken the back-pressure out of the way of the moving pistons. So that a heater that, before the water enters the boiler, effects one-eighth of the heating required, may in some cases save one-quarter or more of the fuel, besides securing even steam.

Accordingly the results of a great many tests with the Magoon stack-heaters and with the compact heaters made by the Feed-Water Heater Co. at St. Johnsbury, Vt., tests continued often during several months upon engines exchanging trains daily, or with the heater alternately connected and disconnected, or using alternately the pump and heater on one side and the injector on the other, prove experimentally an actual saving of from fifteen to thirty-four per cent. of the carefully weighed fuel.

This is the saving when using a pump over the very best the engines could do with either pump or injector alone. When the heater is connected with an injector it cannot, of course, effect so much saving, for the already warm water cannot have its temperature raised so much, but the heater easily raises it to an average of 210° and will give economy in proportion, as the injector works at a low temperature. Generally receiving warm water and delivering it hot, the heater may effect six per cent. of the whole heating required to make working steam, and with this help, the conditions of

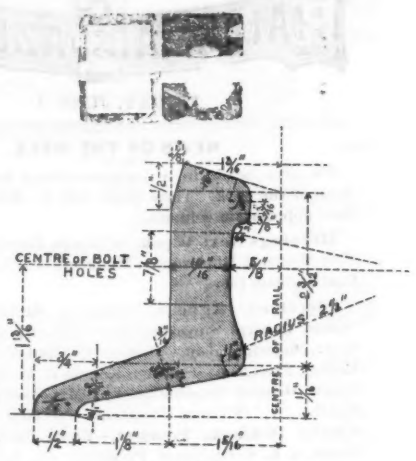


Old 63-pound Section.

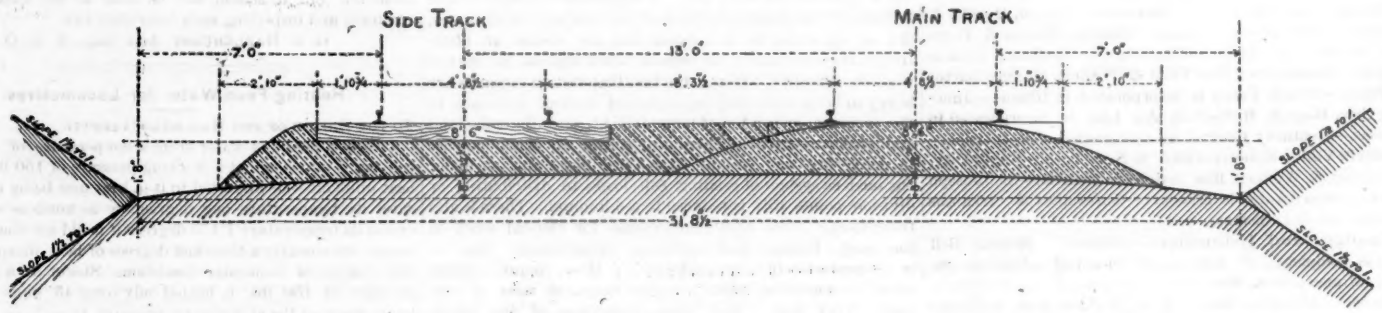


Standard 74-pound Section.

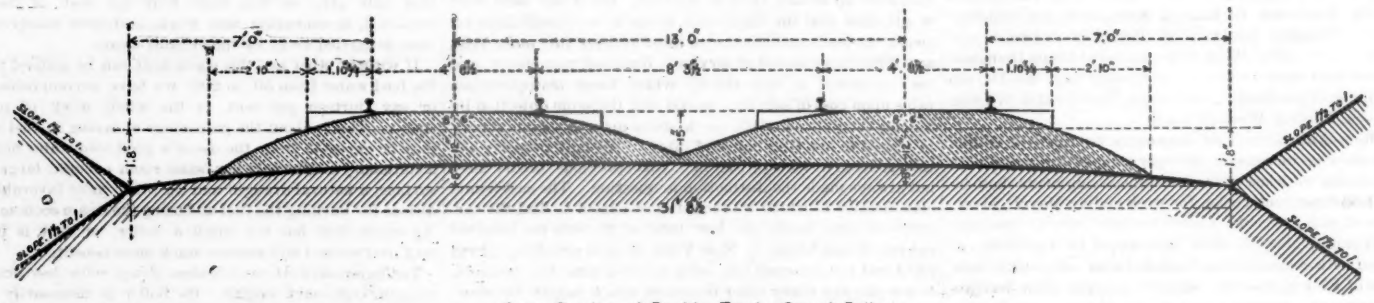
Scale ½ Size.



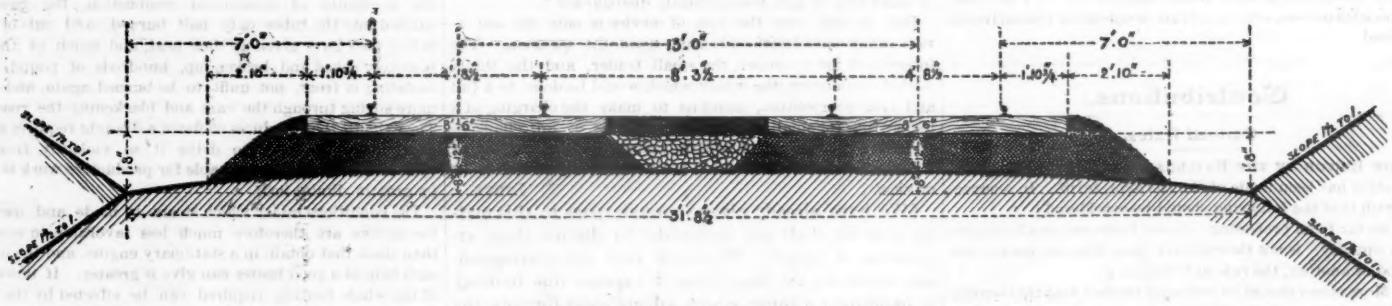
Standard Rail Splice



Cross Section of Main and Side Tracks, Main on Gravel, Side on Engine Cinder.



Cross Section of Double Track, Gravel Ballast.



Cross Section of Double Track, Broken Stone Ballast.

ERIE STANDARD TRACK.

economical combustion and work may be so far secured that the whole saving will amount to ten or fifteen per cent., as the engines tested show. The most economical arrangement for feeding a locomotive boiler is demonstrably a pump with feed heater, but the heater with low temperature injector shows great economy.

In almost all the tests made, with either pump or injector, the steaming of the engines was so much improved by heating the feed that it became possible in addition to taking inch and a half pipes into the heater, to further free the exhaust by using larger main nozzles, and the engines move as though they had much more boiler pressure than the gauge shows. So great a saving of fuel is effected, and the efficiency of a locomotive is so much increased by an appliance costing only two or three hundred dollars, and not liable to give any trouble, that it must be adopted; as one of the largest locomotive builders says, he expects to see every locomotive in the country equipped with a feed-water heater.

HENRY FAIRBANKS.

Erie Standard Track.

The accompanying illustrations of Erie standard track are not given as being novel, but as examples of good recent practice. The formation of roadbed and ballast is essentially that long used by the Pennsylvania, and more recently used by the Erie in new work. In fact it differs from the Pennsylvania standard only in having 10 inches more between centres of tracks; and from the Erie formation on the Bergen County line in an additional width of 2½ inches from the rail to outside of ditch.

The 74-lb. rail section is the standard for the main line. For the most important leased lines, such as the N. Y., P. & O., a 68½-lb. section is used, differing from the 74 in that the head is $\frac{1}{32}$ in. narrower at the widest part, and $\frac{5}{32}$ in. shallower, and the base is $\frac{1}{16}$ in. narrower. The other dimensions are the same, and they splice together. Attention is called to the light web and heavy head and flange as compared with some other recent designs, and to the radius of the upper corner, $\frac{7}{16}$ inch. The old 63-lb. section was adopted by the Erie in 1875, and is now used only on branches and on leased lines of minor importance. It is here shown only as the germ from which in 11 years the 74 has developed. The angle splice plates are of two lengths, 40 in. and 25 in., the long plates weighing 55 lbs. per pair, and the short 35 lbs. The short splice is used as a suspended joint, and the long three-tie splice is supported. Elastic washers are used on the splice bolts.

The ballast is broken to pass through a 2½ in. ring. Sixteen ties are used for 30-ft. rail on main track and 14 on branches. When the 3-tie joint is used 15 ties are placed between the ties supporting the joints.

Private, local and all sidings used for standing cars or handling freight are provided with blind switches to prevent cars running out on the main track by accident.

The elevation of the outer rail on curves on all single track is at the rate of 1¼ in. for each degree until the maximum elevation of 6 in. is reached. On double track the same rule holds except on grades of 25 ft. or more. On ascending grades the elevation is according to the following table:

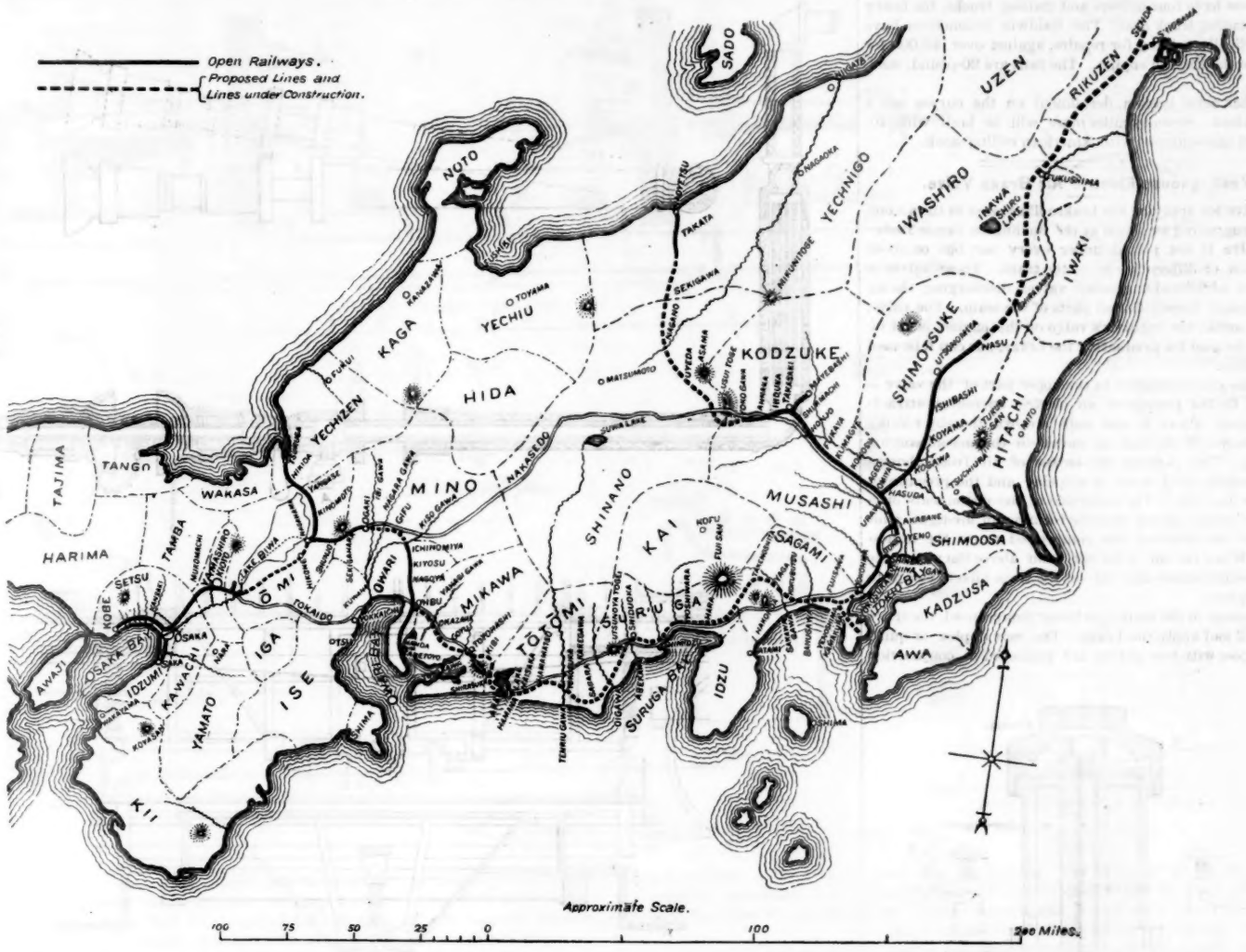
30 ft. per mile, elevation 1 in. per degree.						
35	"	"	"	⅞	"	"
40	"	"	"	⅝	"	"
40 and 50	"	"	"	½	"	"
60	"	"	"	⅜	"	"

until the maximum of 6 in. is reached.

It is directed that all curves of over two degrees shall be relocated with spiral ends where practicable. The pocket-book of instructions for standard track issued to employés contains tables and instructions for laying out the spirals.

Railroads in Japan.

The first line was made from Yokohama to Tokio, about 1870 another line was made from Kobe to Osaka and thence to Kioto. For some time little was done, owing to political trouble, and afterwards an extension was made from Kioto, on the shore of Lake Biwa. From Osaka steamers run across the lake to Nagahama. From Nagahama a line was finished in 1883 to Tsuruga, thus giving communication with the western coast of the country. Again from Nagahama, lines have been made in the last four years to Nagoya and thence to the sea at Taketoo. From Nagoya the main trunk line is now under construction, which will come in at Yokohama with the Yokohama-Tokio line, as first named. While the works near Lake Biwa have been under execution, lines have been



RAILROAD SKETCH MAP OF JAPAN.

carried from Tokio to the north as far as Utsunomiya and Nasu.

From Nasu to Shiogawa the line is under construction. Taking the latter place as the northernmost point, there will be continuous communication of some six or seven hundred miles to Kobe in the south. The side branches, the longest of which is that to Mayebashi, are additional to this. The Mayebashi line passes through one of the great silk districts of the country, which is thickly populated, and the line proves very remunerative. Beyond Yokaywa the line is partly completed to Naoyesdksu. This line is at right angles to the central spine of mountains, which goes through the whole length of Japan, and it will be seen on reference to the map that with the exception of this Naoyetsee line and that to Tsuruga the railways generally run parallel to the mountains and alongside the sea. The steepest grade in crossing the mountains is 1 in 40. The gauge is 3 ft. 6 in.

The engines for the Japanese system are all built in England. The cars are now built in Japan. It is stated that the quantity of rails purchased from England and Germany last year by the Japanese Railway Bureau and the Japanese Railway Company was sufficient to lay 300 miles of line. Additional orders for 150 miles were sent to Germany by the Railway Bureau during the first quarter of the current year. The average price last year was £4 per ton, but this year it has been found to range between £4 and £5 per ton.

General Alexander Before the Inter-state Commission.

On April 28 General E. P. Alexander appeared before the Inter-state Commerce Commission at Atlanta, Ga., on behalf of the Central Railroad of Georgia. Some abstract of the argument which he made at that time is given here.

The gist of the law is contained in provisions for the prevention of pooling and for preventing the charge of a greater rate for a short than for a long haul. The first, unfortunately for the country, is not in the power of the Commission to consider at this time. If it were, the former practice of the railroads in that respect would be approved, and the Commission would become, in effect, the pooling commission of the railroads of the United States, for the purpose of enforcing contracts, for division of business and maintenance of uniform rates.

A diagram was shown giving the rates and distances for various points between Savannah and Mobile. The New York rate at Mobile, 850 miles from Savannah, was given at 65 cents, while at Butler, 240 miles from Savannah, it is $1.57. The maximum rate at Mobile is fixed by ocean competition, and while it may go down as low even as 20 cents, for this argument it is taken at 65, its highest point. To reduce the rates at intermediate points to the Mobile rate would be to lower them by from 28 to 61 per cent., that is, to bring them down to a ruinous point for the railroads—to the point of bankruptcy. But these present local rates are not exorbitant, and there has been neither public nor private complaint of them. Moreover, since its organization the company has paid but about 6 per cent. to the stockholders on their investments, and there is not another road in the South whose record is equal to it in this respect. None of the representative roads have been steady dividend payers; many of them have never paid any dividends, and many of them have passed through the hands of receivers. The stocks and bonds of the Central aggregate only about $20,000 per mile. It is a short line to most of its territory and has exceptionally good terminal facilities; and being one of the oldest roads, population and business have grown up along its lines, under the stimulus which railroad transportation affords. The whole tendency and effect of the fourth section can be condensed into the single phrase, *a penalty on competition*. The four classes who will oppose the suspension of the clause are the steamboat men, who wish to have railroad competition thrown into irons and hampered with a ball and chain; the representatives of the narrow-minded class found in cities along the seashore, who think that a restriction upon the system of railroad competition would give cities large comparative advantages over cities located in the interior. They think that, the growth of interior places being checked, future development would be forced to take place principally at seaports. The third class are those representatives of interior local points which, not having the advantages of competition, wish to take them from those who have; and, finally, the fourth class of objectors are those who think that railroads are immense corporations which oppress the public, and which, having secured their rights of way by the right of eminent domain, should be required to serve the public at whatever rates the public chooses to pay.

We can point with pride to the high and general satisfaction of the transportation service in the South. It is apparent that we are fostering with much success the growth of manufacturing, mining and commercial enterprise throughout our territory.

The exhibit of local and through rates shows that any large reduction of rates would reduce our revenues to the point of bankruptcy of the railroads. But, it is asked whether a large reduction would not turn a great volume of business from the West to Southern seaports, and thus compensate for the lower rates? This would not be the case, for the reason that vessels carrying away such heavy products as would go to the Southern ports could get no return cargoes. The result would be that their rates upon outgoing products must be nearly enough to pay for the round trip. The export business to foreign countries must always be done through commercial and financial centres, such as New York, Philadelphia, Baltimore and Boston.

It should be noted that the injustice which is apparently done to the local points is more apparent than real. Concessions in rates which are given to competing points do not stop in the city limits, but are carried outward in the trade of the town to every trader or producer who buys or sells there. The town is but the distributing centre, which receives concessions in rates and passes them on to those who trade there. The present system of giving lower rates to competing points provides concentration of capital in business in large concerns which can serve their customers more efficiently and cheaply than smaller ones. It enables the smaller consumers, producers and dealers to trade near at home, where their credit is better known, and where they can secure better terms than if they had to trade in distant centres. Any adical change in the methods of transportation now prevalent promises only great disturbance and no improvement. These methods are natural outgrowths of the political system of the country and of its geographical features. Being asked, as a matter of fact, if the Central was able to make long hauls at less than three-tenths of a cent a ton a mile General Alexander answered, Yes, if it is extra business. Being organized for business, having equipment and rolling stock and a track not fully employed, we can take extra business at a very small expense: but the additional profit of carrying this extra business enables us, in return, to reduce rates on the regular business. So, when a railroad is free to take any business which will pay a profit above the bare cost of handling that business, that tends to benefit even the local costumer who seems to be discriminated against.

Finally, the relief asked from the restrictions of the fourth section is more in the interests of the communities we serve than our own. These restrictions act as a penalty upon competition. Competition destroyed, each railroad is left to serve the territory to which it is the short line, and is prevented from competing in the territory of any other railroad. This state of affairs would make more net money for each of the railroad systems of the South than the present system, which allows them to compete in each other's territory. I will willingly abandon competition at Mobile and New Orleans if the lines which compete for my nearer business are restricted in that competition. I do not care to take business into the territory of anybody else if no other system is allowed to come into mine. But I foresee clearly that it is not for the interest of the country that so radical a change be introduced, for it could not stand if it were attempted.

Railroads in Hawaii.

There are now operated in Hawaii 20 miles of 3-ft. gauge road, and in Maui 15 miles. These lines skirt the coast, and nearly all their traffic is bringing sugar to the ports. The mountain sides are cut by deep gorges, making very difficult location. On the Hawaiian line there are several 60° curves on bridges, one 70° on a trestle, and one 70° in a cut. The maximum grade is 118 ft. per mile. This road has one 12½-ton Baldwin locomotive, one 7½-ton Baldwin, and one 7½-ton English. The lighter

locomotives have four drivers and trailing trucks, the heavy one has leading truck also. The Baldwin locomotives have cost practically nothing for repairs, against over $3,000 for repairs to the English engine. The rails are 20-pound, steel, English.

There has never been a derailment on the curves nor a fatal accident. Seventy miles more will be built with 40-pound rail and equipped with American rolling stock.

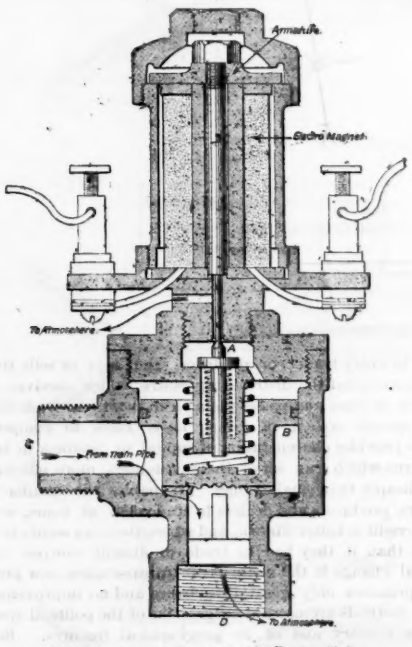
Westinghouse Electric Air Brake Valve.

The valve for applying the brakes illustrated in the accompanying engraving was used at the Burlington Brake Tests.

This valve is not placed under every car, but on about every tenth or fifteenth car of the train. These valves in effect form additional engineers' valves, discharging the air simultaneously from different parts of the train. The valve, however, unlike the engineer's valve on the engine, is not intended to be used for graduating the brake, nor can it be used for releasing.

When the electro-magnet in the upper part of the valve is energized by the passage of an electric current, it attracts the armature above it, and pulls it down, thereby forcing a small valve off its seat, as shown in the accompanying engraving. This permits the escape of air from above a piston normally held down by a spring and the pressure of air on the top side. The underside of the piston seats on a rubber or leather gasket, thereby forming an air-tight joint to prevent the escape of the compressed air to the atmosphere. When the air is let out from above the piston the latter rises and allows the air in the train pipe to escape to the atmosphere.

The pressure in the train pipe being thus reduced, the triple pistons fall and apply the brake. The new duplex or quick action triples with two pistons are employed in conjunction



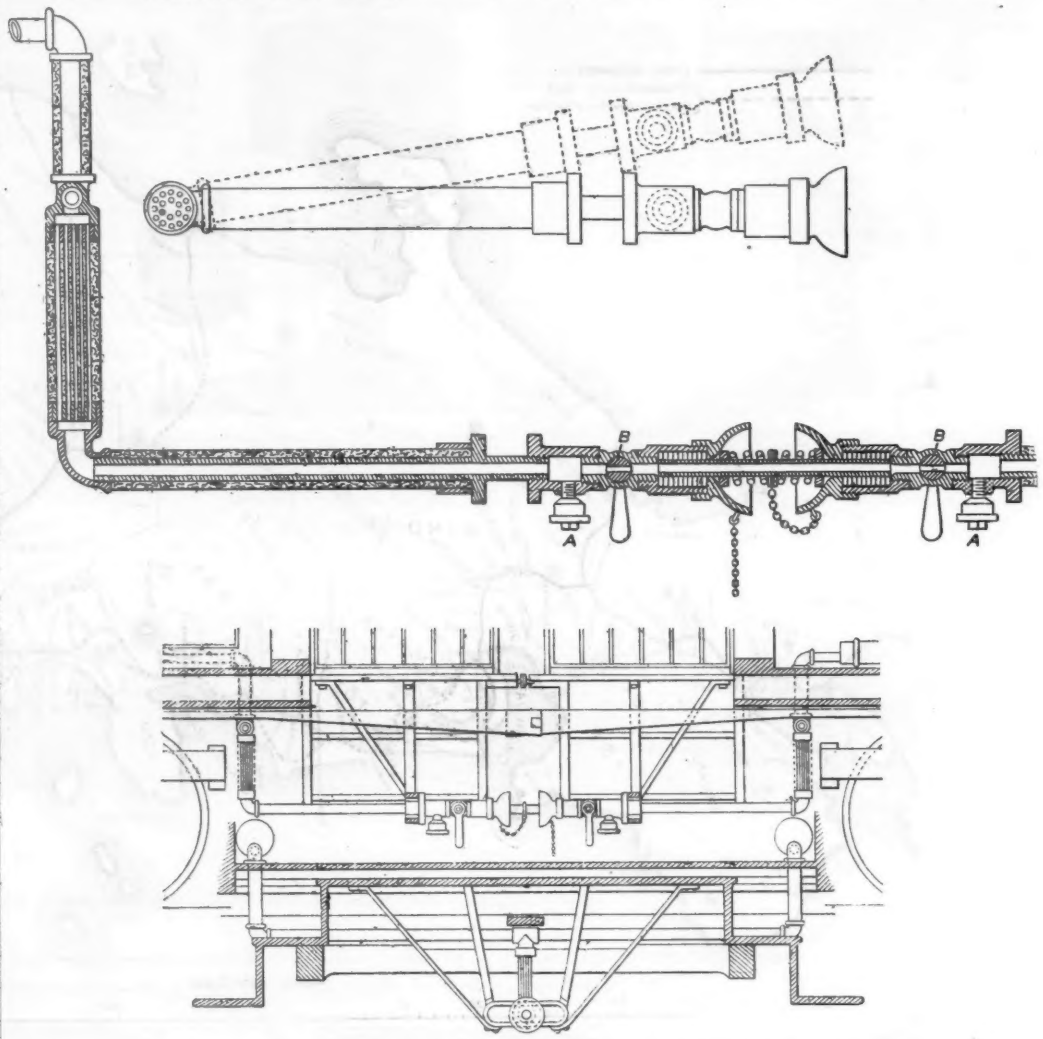
Westinghouse Electric Air Brake Valve.

with these electrical valves. As already explained in these columns, the quick action triples act on the principle of letting air out of the train pipe into the cylinder. When the pressure in the cylinder nearly equals that in the train pipe, a check valve closes in the triple, and the air from the auxiliary reservoir flows into the cylinder and increases the pressure there to the normal amount.

The Westinghouse Automatic Air Brake is applied by letting compressed air escape from the train-pipe, and it is obvious that the quicker the air escapes the quicker the brakes will be applied. It was found at the Burlington Brake Trials last summer that the brakes on the rear car were not applied for 19 seconds after the engineer's valve on the engine had been opened. This was caused by the great distance the air had to travel in order to escape through the engineer's valve on the engine to the atmosphere, the distance of which from the fiftieth or last car was fully 1,900 feet. But with the new triples, the air can escape into each brake cylinder. As, however, the pressure in the train pipe must be first reduced before this can take place, even the new triples act in succession throughout the train commencing from the front end. When, however, the electric valves are used the pressure in train pipes begins to fall simultaneously at several different points in the train, thereby gaining two important advantages; quickness of action, and absence of shock, the successive action causing shock no longer existing when the air is let out at several points in the train simultaneously, as shock does not appear to occur when the brakes are applied simultaneously.*

It will be seen that with the electric valves, air escapes into the atmosphere at each one, and that the consequent fall in pressure permits each lower piston of the new quick acting triple to let air from the train pipe into the cylinders, thus further reducing the pressure in the train pipes.

* Shocks may, however, be experienced even with electrical application, but the condition under which this occurs are not likely ever to arise in actual railroad practice. This subject is more fully dealt with in another column.



GOLD'S AUTOMATIC STEAM-HEATING PIPE COUPLING.

Automatic Steam Coupling.

Messrs. Edward E. Gold & Co., of New York, have designed a flexible metallic coupling for steam-heating pipes, between cars, which is automatic, both for connection and for disconnection. It consists of a ball-shaped cup, or sleeve, at the ends of the pipe on each car, into which a hollow brass pin is guided and slides, and through which the steam passes. This smooth pin is slightly conical at each end, so as to be guided readily by the bells and slip easily into the sleeve, forming a steam-tight joint, in the same manner as the piston rod of a pump or engine makes a tight joint in its gland. It is to be observed that this connection is purely automatic—that in coupling or uncoupling cars the steam connection takes care of itself. Steam is turned on or off by the cock *B*.

Flexibility is secured by making the vertical connection of the sleeve to the heater in the car of a number of small brass tubes bunched together. The advantages claimed are that the connections are all metal and flexible, the coupling automatic, and the utilization of the usual car coupling to hold the connection intact.

Distribution of Union Pacific Stock.

The last report of the Union Pacific gives tables of the distribution of the stock of the company, showing its geographical distribution by states and countries, and also the sizes of the holdings of individuals. Of the 608,685 shares, 4,951 New England owners have 243,000 shares, and 105 foreign owners have 142,000. The rest is held in the United States other than the New England states. The individual holders are as follows:

	No of owners.	No. of shares.	Av'ge holding.
1 to 10 shares each	2,834	17 4 4	6.15
11 to 100 "	5,580	129,149	23 14
101 to 250 "	322	55,252	171.50
251 to 500 "	127	45,114	355.°3
Over 500 "	116	377,220	2,583.70
Total	9,175	608,735	98.26

Among women there are 2,012 owners, holding 53,975 shares.

Cable Roads.

Mr. D. J. Miller, engineer of the Tenth avenue cable road, gives, in the May number of the *Journal of the Association of Engineering Societies*, a valuable paper on "Traction Rope Railways." A brief history is given of the development of the system of to-day, and a more particular description of the duplicate system of the Tenth avenue line.

Four years ago there were in the United States 36¼ miles of cable road in operation and under construction. January 1, 1887, there were 116 miles additional in operation and under construction, making a total of 152¼ miles, and from present indications it is fair to assume that at least 100 miles will be added to the above figure during the ensuing year.

The following summary is given of cable roads in operation and under construction in the various cities in the United States:

Chicago: 20¼ miles in operation since 1882 and 22 miles under construction.

Cincinnati: 8 miles in operation since Oct. 1, 1886.

Kansas City: 4 miles in operation since June, 1885, and 30 miles under construction.

New York City: 6 miles in operation since August, 1885, and 4½ miles in operation since Dec. 1, 1886.

Philadelphia: 18 miles in operation.

St. Louis: 6 miles in operation since April, 1886.

San Francisco: 33 miles in operation, some of it since 1876.

Several miles of road have recently been put in operation in Melbourne, Victoria, and about four years ago a road was built in New Zealand. In 1884, 2 or 3 miles were constructed in London, England.

Mr. Miller gives an estimate cost of cable roads for 2½ miles, everything included:

2½ miles road-bed complete, paving included	$319,000
Plant, including real estate, buildings and motive power complete	113,500
Rolling stock	70.000
	$502,500
Add 10 per cent. for miscellaneous expenses	50,250
Giving total cost of road and equipment	$552,750
Operating expenses per year, $102,953. To this add interest of 5 per cent. on first cost of road, say $600,000, $30,000, making total operating expense	132,953

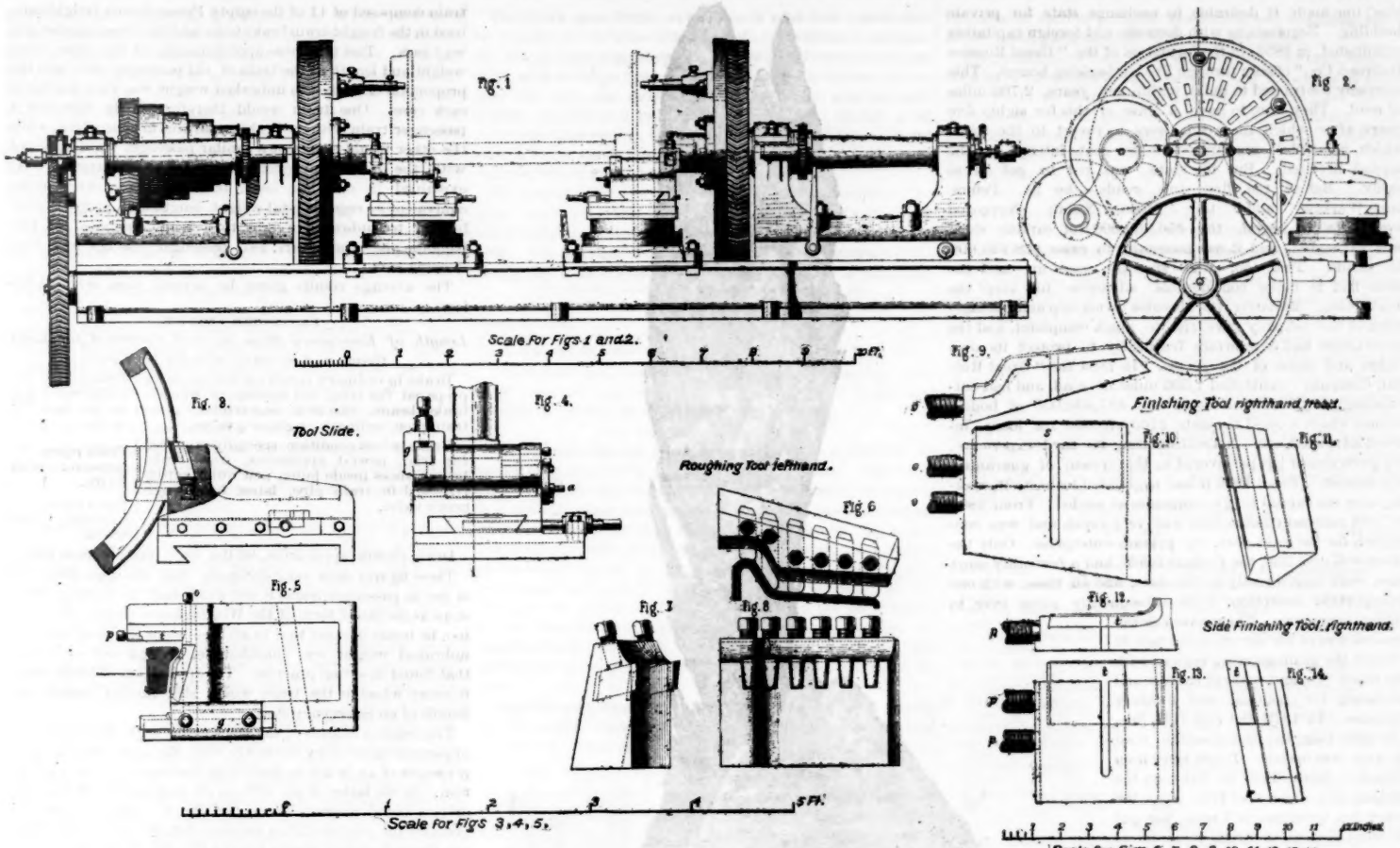
This would require a traffic of 2,659,060 per annum at 5 cents. The excursion traffic being a large item with all cable roads, we will allow 25 days during the year in which 20,000 passengers will be carried, making 500,000, leaving 2,159,060 passengers to be carried in the remaining 340 days, which gives us 6,350 passengers per diem. If 75 per cent. of this number, or 2,000 per mile per day, can be calculated on with a horse road, it will be perfectly safe to invest in the cable system owing to the increase.

As the above is for 2½ miles, one mile of road will cost $221,100. By multiplying the latter figure by the number of miles desired to build, a close and reliable estimate will be obtained. The foregoing covers real estate, buildings and equipment. Operating expense covers officers' salaries, pay of employés, taxes, and in fact every item of expense connected with the operation of the road.

It must be borne in mind that the estimate given above covers the expense of making 435 round trips every 24 hours.

To perform this work with animal traction would require 272 horses on a comparatively level road, which would cost annually for maintenance and renewals	$59,568
The operating expenses of the motive power with the cable system	26,640
Showing saving annually effected	$32,928

The estimate on cost, and also operating expenses, are liberal, but the minimum number of horses has been considered. With animal traction there could be no sudden expansion of



THE EHRHARDT TIRE-TURNING TOOLS.

the carrying capacity; but with a road such as described above it is only necessary for a railroad company to have adequate rolling stock and they are prepared for any emergency. There is no other system of traction that can so readily respond to the demand of traffic for increased accommodation. Two passenger cars can be attached to a single grip-car and carry, easily, 125 passengers. And by supplying cars sufficient to dispatch one train every minute a carrying capacity of 7,500 per hour in one direction would be secured, or a total of 15,000 passengers.

The estimate of cost here given is based on prices and conditions for construction of roads in large cities such as New York, Philadelphia, Boston and Chicago. For smaller cities considerable reduction might be made.

The Ehrhardt Tire Turning Tools.

Heinrich Ehrhardt in Düsseldorf, well known in Germany and somewhat in this country for various improvements in machine tools, has invented a series of tools, reproduced in this number from the German "organ" for turning off iron tires, which are claimed to do double the amount of work that the ordinary turning tools accomplish. They are also claimed to give much better workmanship, and such a perfect finish that the least flaw in the steel becomes immediately apparent. The further claim is made for this system of turning that by the use of properly made tools the glassy hard places produced by braking can be reduced to the proper profile without resort to grinding.

The general principle of the new device is the employment of a number of cutters set by a templet in a peculiar holder in such a manner as to cut out exactly the tread profile desired.

The lathe itself differs little from the usual ones. Angle-toothed gears are used for the purpose of getting a smoother movement. The most important change is the form of the tool support. This is very strongly made, and the upper slide instead of being held up to its work by a screw, is supported by a wedge, which is regulated in turn by a screw at right angles to the cutting tool axes, giving a remarkably steady movement and perfectly uniform support to the whole row of cutting tools. Two forms of tool are required to complete the work. The roughing tools shown in figures 6 to 8 are of rolled steel bars without any smith's work, cut off on the end to the desired level, and then rounded off so as to give but a short cutting face. These tools are set by a plate templet to the required profile, and their effect is of course to plow a series of grooves on the tire, giving an approximation to the finished shape. The finishing tools shown in figures 9 to 14 are then put into the slide, as shown in figures 3 to 5. These consist of thin strips of flat steel, which have been bent into shape in a proper former and then worked to a templet, and are held in the tool head by set screws. It is claimed that these cutters are easier to make than an ordinary turning tool. The finishing tools are only ground on the upper cutting edge, so that the profile to which they have been worked out in the first place remains constant and unaltered.

The roughing tools can be ground as is most convenient, since the profile formed by them can be readily adjusted in a few seconds by bringing them severally up to the face of the pattern according to which they are to work. The grinding of the tools can be done on any ordinary grindstone, but a special holder is furnished with each machine for grinding the roughing tools.

The high duty of these tools is attributed to the elimination of the side friction caused in taking a big chip with a common turning tool. The process has been patented by Mr. Ehrhardt in this country.

Russian Railroads.

April 27, 1886, was celebrated by the Russians as the semi-centennial of the birth of their railroad system. The press of the empire took the opportunity for an extended review of Russian railroad history, which has been summarized by the *Archiv für Eisenbahnwesen*, of Berlin.

To F. A. Gerstner, Professor of Mathematics at the Vienna Polytechnic Institute and author of a book on "The Internal Commerce of the United States," belongs the credit of the first line. Called to Russia in 1834 as a mining expert, he laid before the Czar a plan for a system of railroads connecting St. Petersburg and the cities of the interior with the Black Sea. The Czar was interested at once, but the commission of high state officials to which he submitted Gerstner's scheme reported adversely. The same objections were urged that had been brought up in England and other countries, in regard to the enormous cost of such a venture, and the industrial disturbances that would follow. In addition, it was claimed that the heavy snows and intense cold of a Russian winter would prevent regular traffic. Seeing that the only way to overcome these objections was by a practical experiment, Gerstner drew up plans for a line seventeen miles long to connect St. Petersburg with the royal castles of Zarskoe-Lelo and Paolovsk. The Czar's examination and approval was secured for these through Count Bobrinsky, well known to the Russians for having introduced the beet-root sugar industry. A company, including Gerstner and Bobrinsky, was organized with a capital stock of $2,625,000 in assignats. The conditions of the charter were more favorable than any that have been granted since, allowing the company full control of rates and setting no limit to the time of its possession. Gerstner was assisted in the work of construction by a strong force of engineers, native and foreign, 2,500 laborers and 1,400 soldiers. The country was level, and everything favorable to the work. To avoid trouble from snow the road was elevated upon a slight embankment, in which the sleepers were laid without ballast. A gauge of 6 ft. was adopted, as Gerstner considered Stephenson's 4 ft 8½ in. too narrow to give the best results. By the terms of the charter, all necessary iron work and equipment was to be bought of Russian manufacturers, if it could be so procurred for not more than 15 per cent. advance over the price of the foreign article. But, as Russian manufacture was in its infancy, practically everything had to be imported, being exempted by the government from tariff charges. Gerstner pushed the work with such energy that all the track was laid by the close of the year. Traffic was delayed another year, however, owing to repairs made necessary by hasty construction, and to the failure of the rolling stock to arrive from England. At first horses were used for motive power, but locomotives soon took their place. The stock of $2,625,000 in assignats, [afterward funded] at $787,500 in silver, did not furnish capital enough, and bonds were issued amounting, in 1884, to $1,350,000. A second track had been laid in the meantime, however. From the first the traffic surpassed all expectation. In the first year 597,665 people were carried, and fares amounted to $576,668. The business of the road has been doubled since then, but still is entirely local, as the gauge differs from that of every other road.

Gerstner's experiment was a success, but nothing more was heard of his scheme for a railroad system. Before 1842 various other plans were submitted to the Czar, one by a Leipsic banking house; another by the State Secretary for a six-track line from St. Petersburg to Moscow, three tracks for horse and three for locomotive power, the road to be built and owned by the state instead of by a private company, "in order to prevent traffic in stocks," but all were killed by the commissions to which they were submitted, and nothing was done save to send two engineers to the United States. The report of these men, in 1842, was so favorable to the building of more roads that the Czar determined to take the matter into his own hands. All his commissions had persistently reported against railroads in general, and a St. Petersburg-Moscow line in particular, on account of the engineering difficulties presented by the Valdai hills and the swamps of the Novgorod region. He therefore dismissed them, and appointed a new one with the heir-apparent at its head, to build the road at state expense. The work was put under the control of the two engineers who had been in America, and they were to be assisted by an American engineer, Major Whistler, at a salary of $1,000 per month. Through his advice the 5-foot gauge was adopted, which has been retained in other Russian roads with the exception of the Warsaw-Vienna and Warsaw-Bromberg and a few local lines. This was narrow in comparison with the width then in fashion, which found its extreme in the 7-foot gauge of the English "Great Western." Whistler's advice was also adopted in the matter of track, for which an iron bar of 60 lbs. to the yard was used, supported every three feet by a cross tie.

It was nine years before the whole "Nicholas" line from St. Petersburg to Moscow, was completed. What caused this long delay is not very clear. There are indications, however, of corruption, which is made still more probable by the excessively high capitalization of the road, $264,000 per mile in 1883. In 1868 the management of it was transferred to the "Great Russian Company."

At about the same time, the Warsaw-Vienna and the Warsaw-Bromberg roads were being built at state expense, at the standard gauge of 4 feet 8½ in. agreed upon with the Austrian and German authorities. The former was opened in 1848, the latter not till 1863. Till the death of Czar Nicholas, in 1855, no other roads were begun except one of 28 miles from St. Petersburg to the Czar summer residence, and at the end of 1855 Russia had but 600 miles in operation against 8,000 in England and 4,700 in Germany.

The Crimean war of 1853-56 forced upon the Russians the importance of railroads for military purposes, and Alexander II., as soon as he came to the throne, determined upon new construction. The shattered condition of the public finances, and the dearly bought experience with the "Nich-

olas" line made it desirable to exchange state for private building. Negotiations with domestic and foreign capitalists culminated, in 1857, in the formation of the "Great Russian Railroad Co.," chiefly through French banking houses. This company contracted to build, within ten years, 2,700 miles of road. They were to have a lease of this for eighty-five years, after which the roads were to revert to the state, which meanwhile guaranteed 5 per cent. interest on the capital invested. But the state was not to get off so easily. Before the first two roads,—the St. Petersburg-Warsaw and the Moscow-Nishni Novgorod—were fairly begun, the $56,250,000 of capital stock was exhausted, and it was necessary to raise $28,125,000 by bonds. This too, was speedily used up, and the state had to make considerable advances to keep the work going. Moreover, the absentee ownership and management of the company gave rise to much complaint, and the government had to interfere frequently to protect its own rights and those of the people. In 1884 the "Great Russian Company" controlled 1,530 miles of road, and had outstanding $56,250,000 of stock, and $37,500,000 of bonds, besides which it owed the state $103,875,000 for loans, interest advanced, etc. Notwithstanding its hard experience, the government has persevered in the system of guaranteeing interest. Since 1866 it has negotiated loans itself, making over the capital to the companies as needed. From 1865 to 1878 railroad construction was very rapid, and was conducted, for the most part, by private enterprise. Only the Moscow-Kursk line, the Finland roads, and a few other short ones, were built directly by the state, and all these, with one unimportant exception, were subsequently given over to private companies. The greatest development was in the direction of roads to connect the grain-growing regions with the Black Sea, and roads in the east and southeast for political and military purposes. In 1872 the Poti-Tiflis line, 180 miles long, the first mountain road in Asia, was opened. It has since been extended from Tiflis to Baku on the Caspian Sea, and a line from Poti, the Black Sea terminus, to Varna, has put Western Europe in direct communication with the Caspian.

Since 1879 Russian zeal for railroads has cooled somewhat, owing to the poor crops of 1879-80 and the low state of public finances. The abuses of private management have induced the government to increase its influence over existing lines, and to resume the building and management of new ones. Since 1881 a number of private lines have passed under state control, and all now in process of construction are state roads. A marked step in the same direction is the general railroad law of June 12, 1885, by which an attempt is made at a uniform regulation of all traffic on public and private roads.

The same law provides for a railroad commission, with extensive powers to examine, and in certain cases to control.

Plans are constantly being mooted for a most comprehensive system of new lines. In 1883 the press announced that the long-projected line from Resht on the Caspian to Teheran, was to be undertaken at once. A road has been planned from Drenburg, in the southwest, across Siberia, via Tobolsk and Lake Baikal, to North China and the Pacific. Only scraps of these have been built, however, and their outcome is doubtful. A road is soon to connect Astrakhan with Central Asia, by which Russia will get a still tighter grip on the industry of Turkestan, Afghanistan and Persia.

Miles built before 1865	2,356
" " " 1865-70	4,390
" " " 1870-75	4,982
" " " 1875-80	2,314
" " " 1880-85	2,206
Total in 1885	16,248

In 1882 the mileage of road to 10,000 people was in Russia 1.8, in the United States 21, and in England 5.1.

A Cast-iron Stalagmite.

The peculiar object here illustrated is a cone of fused matter—a species of cast-iron stalagmite—formed below a solid emery wheel. The experiment, one of whose results this cone was, was conducted in the works of the Tanite Co., at Stroudsburg, Pa. This fused mass weighed 5 lbs. 1¼ oz., and was about 12 in. high, and 7 in. in diameter at base. The wheel used was 13⅛ in. in diameter by 2 in. in thickness, and ran for half hour at the rate of 1,630 revolutions per minute. In this half hour it ground off 13 lbs. 2¼ oz. of cast-iron. In the same shop, during the same half hour, an expert workman filed steadily on the same quality of cast-iron, and only filed off 6¾ oz. It was found impossible in this particular experiment to combine the whole 13 lbs. 2¼ oz. of cast-iron in the one fused cone.

We can imagine no more striking object lesson for mechanics and for all manufacturers of iron goods than a pictorial illustration showing *on the same scale* the masses relatively removed by the emery wheel and the file.

A CAST-IRON STALAGMITE.

Experiments on Boring and Direct Driving for Rail Spikes.

Herr Dunaj, Royal Inspector of rail-oad construction in Lyck, in Hungary, gives in the German *Organ* the results of 170 experiments made by him on the effect of boring for railroad spikes before driving as compared with simple driving. These experiments were conducted upon ties of unpreserved oak, preserved and unpreserved fir and preserved beech. One rail was secured by spikes driven without boring, and the other by spikes in bored holes of various diameters ranging from a little more than one-half the diameter of the spike up to the full diameter, the hold of the spike in the last case being due, of course, to the additional cross-section needed for the square form of the spike.

The results were very various and rather conflicting. The force required to pull spikes in the different cases ranged from 6,125 lbs. to 13,411 lbs. in oak; from 2,218 lbs. to 6,019 lbs. for fir (the average force required to pull the spikes from preserved fir was considerably greater than for unpreserved, though all were new), and from 6,336 lbs. to 13,933 lbs. for beech.

The pull was carefully vertical, and care was taken to ascertain the allowance to be made for friction, and for the effect of the weight of the tool itself in ascertaining the pull. The spikes were 14 mm. or scant $\frac{9}{16}$ in. square, by 6¼ in. long.

The average results of the different series of experiments are given by the following tables, in which the sign — indicates a decrease in hold due to boring instead of an increase:

Material.	Depth of hole.	Diam. of hole in inches.	Percentage of increased hold with hole.	Diam. of hole, inches.	Percentage of increased strength with hole.	Diam. of hole, inches.	Percentage of increased strength with hole.	Diameter of hole, inches.	Percentage of increased strength with hole.
	In.								
Unpreserved oak	4	...	.....	0.40	— 0.5	0.47	— 1.8	.....	.....
Preserved "	4	...	.....	0 40	— 3.2	0 47	+ 3 0	0.55	+ 3.0
Unpre'rved pine	4	0.32	+ 8.0	0.40	— 3.4	0.47	— 2.8	...	.....
Preserved "	4	0.32	—13.9	0.40	+ 7.0	0.47	+11.0	...	
" beech	4	.....	.....	0.40	— 2.7	0.47	— 1.0	0.55	— 7 9
Preserved pine.	5⅛	...	.....	0.40	—15.5	0.47	—12.4	0.55	— 1.9

Although Herr Dunaj contends that the results show an advantage in boring, it is difficult to see how he reaches this opinion.

In the idea that the less disturbed condition of the fibres produced by boring as compared with direct driving is favorable to the permanent hold of the spike he will probably find more adherents, but it is questionable whether this advantage is sufficient to make up for the extra cost.

The Brake Trials.

Some trials have been made to show in what distance an ordinary passenger train can be stopped, and the results given by a train of old passenger cars fitted with ordinary Westinghouse triple valves, etc., were printed in our last issue. In order to ascertain the difference between their performance and that of a train equipped with the latest improvements, quick-acting triples, 1-in. bore train pipe, improved engineer's valve, etc., some trials were made with a train composed of 11 of the empty Pennsylvania freight cars, used in the freight-train brake tests, and the dynamometer and way cars. This train was approximately of the same total weight and length as the train of old passenger cars, and the proportion of braked to unbraked weight was very similar in each case. One train would therefore fairly represent a passenger train with the brake apparatus in general use, while the other would represent a similar passenger train equipped with the latest improvements in brake apparatus. As explained in our last issue, both the trains were about equivalent as regards total weight, length and proportion of braked to unbraked weight to a train composed of two baggage and express cars, two passenger coaches and four sleeping cars.

The average results given by several runs were as follows:

PASSENGER SERVICE.

Length of Emergency Stops in Feet Corrected for Level Grade and Speed of 40 miles per hour.

Brake in ordinary condition not specially prepared for trial, old appliances, wooden brake beams, cast-iron case triples, ¾-in. train pipe, ordinary engineer's valve.	Train pipe pressure, 68 lbs. to 53 lbs.	ft. 861
Brake in best condition, specially prepared for trial, newest appliances, iron brake beams, shoes inside hung, new quick acting triples, 1-in. train pipe, latest form engineer's valve.	Train pipe pressure, 70 lbs.	594
	Train pipe pressure, 88 lbs.	550

Ditto, electric application, 85 lbs. train pipe pressure, 503.

These figures show very distinctly that the apparatus now in use on passenger trains is not so efficient in making quick stops as the latest form of the Westinghouse brake. It must, too, be borne in mind that in all these stops the proportion of unbraked weight was considerable, though not exceeding that found in actual practice. The application of brake shoes to every wheel in the train would still further reduce the length of an emergency stop.

The relative lengths of the stops made with the improved apparatus shows very distinctly that the gain due to high pressures of air is not so distinct as that due to quick application. In the latter stops, with an air pressure of 88 lbs., the drivers slid an average distance of 75 ft., and with 85 lbs. pressure the drivers slid an average distance of 60 ft. The loss through sliding wheels toward the end of the stop nearly equals the gain in the first part of the stop through the use of higher pressures.

The concluding days of these tests have been utilized for a variety of special tests by which some hitherto obscure points have been settled.

THE EFFECT OF INCREASED LEVERAGE AND PRESSURE.

A run was made with a train of 49 empty cars on the 27th. The Westinghouse brake with electrical application was used. The object of the test was to discover what advantage, if any, was obtained by the use of higher pressure and greater leverage. The results as compared with former tests under similar conditions except as regards leverage and pressure are as follows:

Continuous brakes, 50 empty car trains. Stops in feet.

	Miles.	Miles.
Speed	20	40
Westinghouse electric, May 13, 14	155	578
" " May 27	134	482

The improvement is considerable, but was obtained at the expense of some sliding of wheels, which was practically nonexistant in the earlier tests. Quick acting triple valves, with extra large passages, were used in the later tests.

THE CARPENTER BRAKE.

In the trials of the Carpenter brake with a train of 33 loaded and 17 empty cars the release was made instantly, and consequently the stops were made in such quick succession that the train pipe and auxiliary reservoirs were not properly recharged with air. This test was therefore repeated on the 26th inst., precautions being taken to allow time enough to enable the auxiliary reservoirs at the rear end of the train to be recharged. The difficulty is principally caused by the fact that the Carpenter train is fitted with a train pipe only ¾ in. bore, while the diameter of the air pump is only 6 in. Were these dimensions increased to 1-in. pipe, and 8-in. pump cylinders, the trouble would probably wholly disappear.

The results of the trials are given below. The train was tried with loose couplings and with about ⅛ in. slack between the wheels and the brake shoes, the average stroke of the brake pistons being 7½ in., the total stroke being 10 in.

The results, as compared with those obtained earlier in the trials, are given below:

Carpenter Electro-Air Brake Train of 50 cars, 33 loaded with 42,200 lbs. each, 17 empty, and dynamometer and way car. Total weight of train, 2,960,366 lbs.

Stops in feet corrected for speed.

	Miles.	Miles.
Speed	20	40
Trials, May 18	185	903
" May 26	140	644

The train-pipe pressure, as shown by the gauge on the engine, varied from 80 to 89 lbs. per square inch in the different stops, and the pressure in the brake cylinder on the rear car varied from 57 to 65 lbs. per square inch. The great braking force thus applied to the wheels, about 140 per cent. of the weight of an empty car, caused some of the wheels of the empty cars to slide considerably. As the empty cars are chiefly in the front part of the train, near the engine, a somewhat peculiar action took place. During the first part of the stop, the empty cars did the best braking, holding back the loaded cars in the rear. This is evident when we consider that as long as no wheels skid, the brake on each car exerts the same retarding force. The greater weight of the loaded cars gives them, however, greater momentum,

and they press forward on the empty cars. When the wheels of the latter slide, towards the end of the stop, their retarding force falls, and from doing the best braking, they are doing the worst. Hence, at this moment, there is a sudden surge through the train, which was most felt in the front car, while in the rear car in one stop the slidometer moved 3⅛ in. and in another stop 2½in. These mild shocks are really caused by the use of excessive pressures, which slide the wheels of the empty cars for some distance before the train stops.

A somewhat similar action due to the sliding of the wheels of the empty cars, chiefly placed in the front of the train, was observed in many of the tests of electric brakes. The surge it, could hardly be called a shock, being felt in the front car, while the hind car was quite unaffected.

It may, however, be remarked that the Carpenter brake and the couplings of the train were remarkably free from failures. Several of the vertical plane couplers were broken on both the Eames and Westinghouse trains, while the common draw-bars on the Illinois Central train showed no signs of weakness, not even a link being broken, though nearly all the stops were made with no wedges to take up the slack. This is doubtless attributable to the simultaneous action of the brakes. The absence of shock with brakes operated by electricity will doubtless have an important influence on the life of couplers.

When the Carpenter train arrived at the first stop post the engineer applied the brakes, but with little effect, owing to the wires on the engine having been carelessly and loosely connected. It is somewhat singular that this defect was not discovered when the brakes were tested in the yard before starting for the run.

A somewhat similar occurrence happened with the Westinghouse train. It too was tested in the yard and pronounced all right, but when it had nearly reached the stop post it was discovered that the brakes on two cars were on and had slid the wheels badly. Some difficulty was found on several occasions in releasing the brake on some cars in the Westinghouse train. This is probably due to the peculiar action of the new triple, which reduces the pressure in the train pipe more and the pressure in the auxiliary reservoir less than the ordinary triple valve. Prompt release is facilitated by precisely opposite conditions, a small reduction in the train pipe and a large reduction in the auxiliary reservoir.

DRIVER BRAKES.

Some further trials were made on the 27th and 28th ult. with driver brakes. In order to facilitate comparison with the results obtained earlier in the tests we reprint the results obtained during the first week of the trials and published in a former issue.*

In the latter trials a heavier pressure was used with the Carpenter driver brake and several alterations and improvements had been made in the Westinghouse driver brake. A higher pressure was also carried, though the best stop (836 ft. at 40 miles per hour down a 53-ft. grade) was made with the lowest pressure, 75 lbs. in the train pipe as indicated by the gauge on the engine. The Westinghouse driver brake was also fitted with an apparatus for preventing the wheels skidding. The device was suggested by the well-known experiments of Capt. Douglas Galton, which showed that when a wheel skids the coefficient of friction immediately falls, and consequently a skidded wheel has little retarding influence. A wheel on a good dry rail will not, however, skid until the friction between the wheel and the shoe becomes so great as to overpower the adhesion of the wheel on the rail. In other words, when the retarding force of the brake shoe passes a certain limit, the wheel will cease to revolve or roll along the rail and will skid or slide.

Mr. Westinghouse therefore used in the Galton experiments a device for reducing the air pressure in the brake cylinder when the retarding force became so great that it threatened to skid the wheels. The retarding force is manifestly measured by the pull of the shoes on the brake hangers, and the latter are so hung as to bear against a spring giving a definite and adjustable resistance. When the retarding force exceeds this amount the spring yields and permits a valve to be forced off its seat. This spring releases a certain amount of the air in the brake cylinder until the retarding force is again reduced to a safe limit.

The average results of the various tests made on grade and level are given below, corrected for speed only:

Driver and Tender Brakes only; Train composed of Engine and Dynamometer Car.

Stops in feet corrected for 20 miles per hour.

	May 9, 10, 11.	May 27, 28.
Carpenter	235	193
Westinghouse	252	212
Eames	313	....
Stops in feet corrected for 40 miles per hour.		
Carpenter	1,010	672
Westinghouse	1,207	896
Eames	1,200	....

The improvement effected is very remarkable. The train-pipe pressures used on the Westinghouse engine, varying from 75 to 89 lbs. per square inch, are, however, rarely carried in actual practice, and it would not be advisable to carry such pressures, except where the pressure reducing valve was used to prevent the wheels sliding. The performance of the Carpenter driver brake is certainly phenomenal. As already stated in these columns, it consists of a pair of cams pushed down instead of being pulled up by a vertical cylinder. The air is behind the piston, and consequently there is no piston rod packing leather to be cut by the dirt adhering to the exposed piston rod. The piston rod being normally inside the cylinder, keeps clean.

The Westinghouse driver brake has also a vertical cylinder, and the air also acts on the rear of the piston, thus avoiding the necessity of keeping the piston rod cup leather tight.

* See Railroad Gazette, May 27, 1887, page 335.

The above remarkable performances of driver brakes may be compared with some obtained with Consolidation engines, the trains consisting of engine, tender and dynamometer car only, as in previous tests. As, however, a Consolidation engine has only one pair of wheels unbraked and four pair braked against two pair unbraked and two braked in an American type engine, the tests with the Consolidation should show a better result than those with the regular brake test engines, which were of the American type.

The anticipation was fairly borne out by the results of the trial, considering that the Consolidation engines were taken out of regular service without any special preparation for the tests. The average of the results obtained are given below:

Driver and Tender Brakes only; Trains composed of Consolidation Engine and Tender and Dynamometer Car.

Stops in Feet Corrected for Speed and Level Grade.

Miles per hour	20	40
American driver brake*	220	752
C., B. & Q. driver brake†	235	896(?)

There was some discrepancy in the record of the stop made at 40 miles per hour with the C., B. & Q. driver brake, and possibly the result obtained is not very accurate.

THE ABOLITION OF SHOCKS.

Several experiments have been made with a train of 25 empty cars fitted with the Westinghouse brake. The main object of these experiments has been to ascertain whether it is possible to make emergency stops with a quick acting air brake on a train of that length, without shocks. If it was found that by some modifications of the size of the passages of the triple valves, or by other alterations shock could be avoided on trains of that length, it was intended to try trains of 30 and 35 cars and so arrive at the point where shock commenced. Unfortunately, however, despite all modifications, the shock remained tolerably constant, the slidometer moving from 23½ to 29¾ in. with trains of 25 cars.

The following figures give the results attained with trains of 25 empty Pennsylvania box cars, the dynamometer and the way car being attached, and the trials made on the level:

Speed. Miles per hour	Distance	Movement slidometer	Train pipe pressure, engine	Remarks.
	Ft.	In.	Lbs.	
21	199	29¾	65	Increased leverage and quick acting triples with enlarged passages used and pressure reducing valve on engine to prevent skidding.
21½	205	29⅝	54½	
20	179	25		Original triples and leverage as at commencement of trials.
20	181	23½		Ditto, but with more slack between brake shoes and wheels, each piston about 8-in. stroke. No dynamometer car.

The shock at the last stop pulled the drawhead casting off the end of the tender and concluded the trials. It will be seen that the effect of diminished pressure and leverage and increased stroke of piston is to slightly decrease the movement of the slidometer, but the influence is very slight and the violence of the shock remains objectionable. The train was composed of only 25 new empty cars of a uniform pattern, and equipped with Janney couplers throughout.

The circumstances were therefore all favorable to a smooth stop. The concussion with a long train of cars of different sizes and weights, some loaded to their full capacity and others empty, and equipped with loose couplers of different patterns and heights, would in all probability have been disastrous. The trials, however, have shown that the use of electricity completely abolishes shocks.

VISITORS.

Among the railroad men present during the last week of the tests were I. C. Peasley, Vice-President Chicago Burlington & Quincy; W. K. Morley, Superintendent of Telegraphs, and A. M. Richards, Division Superintendent, Chicago & Alton; Edgar H. Mumford, Mechanical Engineer, Union Pacific; Franklin E. Worcester, Mechanical Engineer Michigan Central.

* This pattern of brake applied to a Consolidation engine was illustrated in the *Railroad Gazette* Nov. 12, 1886.

† This style of brake applied to Consolidation engine was illustrated in the *Railroad Gazette* Sept. 3, 1886.

Railroad Training Schools.

One of the first companies to seriously undertake the establishing of technical training schools for employés was the Northern Railroad of France, which organized classes in January, 1883, at Paris-La-Chapelle for apprentices, sons of active employés of the company. Forty pupils are admitted to these classes each year, by competitive examination. They are not received under 12 years or over 15 years of age, so that at 18 the pupil leaves his apprenticeship with a fair technical education and with a good trade. The programme of studies in the first division is French, geography, history, arithmetic, geometry, chemistry and drawing. In the second division these same studies are continued, with the addition of the theory and practice of machines tools, steam motors and the physics of railroads. From 7 o'clock in the morning until noon is occupied with the studies proper; the afternoon, up to 5 o'clock, is occupied with shop instruction. The shop instruction in the first and second years is confined pretty closely to the principles of machines and tools, and in the third year is devoted to the construction of various parts, to assembling and mounting locomotives and machines and to work at the forge.

The results have been very satisfactory. Twenty apprentices have completed their three years and remain as salaried employés in the shops of the company. Others have chosen to enter the employment of various manufacturers. The more meritorious of the pupils have received cash premiums given by the company, and as a stimulus free passes during vacation are given to the best pupils, over the lines of the Northern Railroad. The entire expense of this establishment has been borne by the company.

Operating Expenses, Union Pacific.

The following table of the ratios of the items of operating expense to the total operating expense (less taxes) is deduced from the figures given in the last annual report of the President of the Union Pacific. It is very seldom that such a careful analysis of expense is published, and the distribution of accounts varies so much on different roads that the figures ordinarily given are of little use for comparison of one road with another. In the present case, however, the items are stated so fully that officers of other roads can use them for comparison by transferring them from one head to another to suit their own systems of accounts. Taxes are not included in the total:

Conducting Transportation.

	Per cent. of total expense.		Per cent. of total expense.
Advertising	.61	Repairs of tenement houses and hotels	.06
Books, printing and stationery	.67	Station agents, operators and clerks	4.77
Cleaning and inspecting cars	1.55	Station labor	2.22
Conductors, baggagemen and brakemen	5.68	Station expenses (except labor)	.55
Foreign agencies	2.01	Station repairs and furniture	.98
General agent and clerks	2.30	Switchmen and yardmen	1.83
Injuries to individuals	.68	Superintendence, dispatchers and clerks	1.83
Loss and damage, baggage	.02	Train expenses	.86
Loss and damage, freight	.20	Telegraph expenses	.28
Loss and damage, property	.21	Use of cars	1.37
Loss and damage, stock killed	.54	Wrecking	.19
Oil, tallow and waste for cars	.36	Total	29.77

Motive Power.

Books, printing and stationery	.04	Repairs of tools and machinery in machine shops	.41
Boiler washers	.22	Repairs and expenses of fuel stations	.89
Engineers and firemen	8.99	Repairs and expenses of water stations	1.02
Fuel for locomotives	10.17	Superintendence and clerks	.52
Fuel and light for engine houses and shops	.32	Watchmen	.44
Oil, tallow and waste	.44	Wipers	.65
Rent of locomotives	.39	Total	32.94
Repairs of locomotives	8.16		
Repairs of engine houses, turn tables and machine shops	.28		

Maintenance of Cars.

Books, printing and stationery	.01	Repairs of sleeping cars	.40
Fuel and light for car shops	.09	Repairs of tools and machinery in car shops	.10
Repairs of car shops and sheds	.08	Repairs of Westinghouse air brakes	.27
Repairs of freight and caboose cars	5.37	Superintendence and clerks	.16
Repairs of passenger, baggage mail and express cars	1.93	Watchmen	.14
		Total	8.65

Maintenance of Way.

Ballast	.14	Repairs of telegraph	.02
Books, printing and stationery	.02	Repairs of work cars and tools	.70
Engineering	.55	Repairs and expenses of section houses, etc	.16
Frogs and switches	.33	Removing snow and ice	1.02
Labor repairing track	10.44	Spikes and rail fastenings	1.15
Protection of river banks	.09	Superintendence and supervision	.56
Renewal of cross ties	3.34	Track rental	.62
Renewal of rails	3.62	Watchmen	.43
Repairs of bridges	2.40	Total	26.41
Repairs of fences, crossings and cattle guards	.58		
Repairs of snow sheds and fences	.19		

General Expenses.

Books, printing and stationery	.03	Incidentals	.02
Clerks in general offices	.24	Legal expenses	.42
Expenses of general offices	.21	Salaries and expenses of general offices	.20
Eastern expenses	1.11	Total	2.23

In the *Railroad Gazette* of May 6 appeared a table of the operating expenses of an important inland road, averaged for two years. By selecting similar items under various heads of accounts from the two tables some interesting comparisons may be made.

Percentage of Total Operating Expense.

	Union Pacific.	Inland.
Train service	10.68	9.85
Engine and water service	21.92	21.80
Station service	12.18*	11.43
Track, bridge and fence repairs	25.59	23.10
Building repairs	1.41†	2.10
Engine repairs	9.85	8.50
Car repairs	9.27	10.50
Loss and damage, freight	.20	.25
Loss and damage, miscellaneous	1.45	1.25

* Includes repairs and furniture.
† Does not include station repairs.

The Rocket.

We find in the *Zeitschrift des Vereins Deutscher Engenieure* the statement that Prof. K. Keller, of the Technical High School in Carlsruhe, Baden, has undertaken to reproduce by correct drawings George Stephenson's famous locomotive Rocket. The journal quoted gives, in No. 14, current volume, engravings of two drawings already made by Prof. Keller, the one being a side view of the locomotive, and the other a sectional view of the fire-box. At the same time it prints a request to all persons having the means of throwing any light upon this interesting subject to communicate with the Professor. The journal asserts that the popular supposition that the locomotive purporting to be the "Rocket, in its original shape and construction," in the Kensington Museum, is, in reality, erroneous, as it has undergone so many alterations that very little of the original machine is left. Many illustrations of the Rocket published since that time are pronounced by the journal as totally unreliable; for instance, that published in "Wood's Treatise on Railroads, 1832," and those in *The Engineer* (vol. 41, p. 481; vol. 58, p. 200).

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Projects for the extension of lines to the Pacific fill the air, but they should be listened to with a good deal of caution. The condition of trans-continental business now is not very encouraging. As far as concerns the reported extension of the Chicago & North-western toward the Pacific, we have the best authority for saying that the company has no projects for the future in that region beyond the completion of the track graded last year 50 miles, or thereabout, west of Fetterman. Further progress in that direction is considered at present out of the question.

The *Engineering and Mining Journal* calls attention to the probability of the rapid extension of the railroad system in British India, and to its necessary effect on our exports of wheat. The figures given for the wheat export of India were 2,000,000 bushels in 1879 and 56,000,000 bushels in 1886. Possibly these are not precise figures, and they are somewhat misleading, for in 1878 the Indian wheat exported was nearly 12,000,000 bushels. At the lowest estimate, however, this increased from 1877 to 1886, something like five times, and the rice export increased in the same period about 42 per cent. This increase, as we have before shown, has been due not only to the building of new roads, but to the decrease of rates on the old ones consequent largely on the low rates on our own roads; and it has again reacted on the price obtainable for wheat by the farmers in the West. India exported in the 9 months ending Dec. 31, 1886, 37,000,000 bushels of wheat; and we exported in 1886 133,500,000 bushels of wheat and flour converted to bushels. It is evident from these figures that, under existing conditions, the competition of Indian wheat is serious enough. But the rates on the Indian lines can be still further reduced and leave ordinary profits on capital invested. In 1884, according to Mr. Jeans, the percentage of net earnings on the capital invested for 10,447 miles of Indian railroads was 5.91, and the working expenses were 37,62 per cent. of the gross receipts.

But there is a strong public sentiment in England constantly pressing for the further and rapid development of the Indian railroad system, and now Burmah adds new territory to be opened up. It is probable that the Indian system will grow tremendously in the next ten years. The obvious lesson is that if the relative importance of the United States in the wheat markets of the world declines, she must find a way to regain in other trade what she loses in this.

THE BURLINGTON BRAKE TESTS.

These exhaustive trials, probably the most complete ever held, are now over, and the competitors retire to consider what further improvements can be made in their brakes, while the staff of observers who assisted in obtaining the records are busily engaged in verifying and collating the figures obtained.

The trials practically leave but three competitors in the field, the Carpenter electro-air brake, the Eames automatic electric vacuum brake and the Westinghouse automatic air brake with electric attachment.

The Card electric and the Hanscom air brakes retired during the contest. The American brake Company, dissatisfied with the workmanship on the cylinders in their 50-car train, did not enter, but propose soon to show what they can do, while the Rote and Widdifield & Button buffer brakes are understood to be waiting for cars.

The last few days of the tests were occupied by various experiments on special points, and in repeating some tests formerly made under adverse conditions. The results obtained are detailed below, but do not show much that is new or unknown before. The conclusion that *simultaneous* action of the brakes is necessary to secure a smooth emergency stop has been confirmed, and so far all experiments with brakes acting quickly but in *succession* on each car have only resulted in severe shocks in the rear end of even a 25 car train. Mr. Westinghouse declares that he is confident that he can abolish the shock without having resort to electrical application, but so far the results have been decidedly adverse to his supposition.

When the valves of an air brake are operated by electricity, the trials show that several very important advantages are gained. The stop can be made in less distance, the pressure rising in the brake-cylinders in about ½ second from the engineer moving his valve, applying the brakes. The release is also instantaneous, the brakes being taken off in about one second on the last car of a long train. That the graduation is perfect is shown by the run down hill, and the fact that emergency stops are made with loose links, without shocks, shows the value of simultaneous action in preventing the blows and bumps, so injurious to cattle and many other classes of freight, not to speak of cars.

Any car repair shop contains evidence in the form of broken and bulged end posts of the too active movements of the slidometer. When the slidometer consists of a load of lumber or steel rails, the car alone suffers, but common humanity calls upon us to reflect upon the sufferings of helpless dumb creatures driven with such cruel force against the walls of their cage.

Electricity once again appears as a possible solution of a difficulty which has not been solved by mechanical means. The only objection raised is the liability of electrical appliances to fail suddenly and without warning. The trials, however, have sufficiently shown that even mechanical apparatus, the fruit of years of improvement, are also liable to fail, and it remains to be proved whether a reasonable amount of talent and perseverance applied to the perfection of electric brake apparatus will not render it as trustworthy as any other work of fallible human hands and brains.

THE USE AND ABUSE OF FREIGHT CARS.

Some figures having interest as bearing on the question of car-service rates are shown in a table compiled by the Car Accountant of the West Shore road, showing the actual time spent by all foreign cars on that road for a single month.* Facts of this kind deserve careful study, for the reason that the decision in regard to the adoption of any per diem basis will, with most officers, hinge upon the relative gross expense or profit of the new plan as compared with the old, and also for the purpose of learning all that it is possible to learn in regard to the question of getting pay from consignees for a portion of the great delays which everybody suffers from. Any system of charging for the *time* of cars will certainly lead to propositions for the collecting from consignees of some portion at least of the time used by them in unloading bulk freight, so that the average time per *loaded* trip, as distinguished from the average time for all trips, will be worth getting at.

Common box cars were kept on an average 5.6 days each, while line cars remained 8.4 days each. (These, and all the figures given, show the whole time the cars were on the road, from time of receipt to the time of return or delivery to another road.) Common cars doubtless make shorter trips, and also, probably, carry smaller average loads and less bulk freight, so that we find here one reason for the recommendation of the late convention, that line cars be exempted from the per diem charge; though it is not a logical one, and the action of the convention was doubtless based mainly on the fact that each road is supposed to have its share of cars in the line and so would naturally lend and borrow equally. In the case of grain carriers, like the Blue Line, for instance, injustice might result from the greater promptness of the loaders over the unloaders, the latter being probably more dilatory than the former in the long run; and a consideration which should be taken into account in dealing with line cars is the difference between large, stout cars and older ones of ordinary capacity. Shippers of lumber and many other kinds of freight prefer the former, and will select them when a choice is offered, so that owners whose stock consists wholly of 10 and 12 ton cars, will be at a disadvantage compared with larger partners who put in new 20 ton cars frequently.

It is noticeable that the cars of the lines regularly working over the West Shore were detained a much longer average time than those of outside lines which probably came on the road largely by accident or carelessness. The latter, perhaps, more frequently than the others were carrying freight which was neither loaded nor discharged on the West Shore's lines. This last item, the traffic which merely passes over the road without any detention, properly speaking, must be remembered in considering any of these figures; for a road situated like the West Shore or New York Central, with their heavy New England traffic, of which the terminal service is all done by others, must naturally show a better average than, for instance, that of the New England roads themselves; or of the Erie, whose proportion of this kind of traffic is probably much smaller. The time of cars on their return journey, which on the West Shore is frequently as an "empty," of course comes into the account, but of actual terminal time there is none at all. The live stock traffic of the West Shore illustrates this point, a certain portion going to New England via Rotterdam Junction, and substantially all the rest going to New York, where the time consumed in unloading and starting the car back is chargeable to the West Shore itself; but the comparison, if it could be made, would be of little value, because this kind of freight is unloaded so quickly. The terminal time of a stock car is doubtless very largely consumed in waiting its turn to be taken back empty, which might be just as great with the New England cars at Rotterdam as with the others. If a large number of cars engaged in carrying lumber or some freight of that nature could be kept by themselves, as stock cars are, and all used in strictly through traffic, some valuable statistics could be gathered.

The "private owners' cars" are almost wholly refrigerator and live stock, which explains the short average time, both kinds carrying loads that are always quickly discharged. The average time of private *box* cars (refrigerator), which, excluding the stock cars, is 4.5 days, seems suspiciously close to that of ordinary box cars (5.6); though the very small aggregate number of cars (59 to 7,859 common) may vitiate the value of the first-mentioned average. A reason for the decision of the convention that the time of private cars should not be paid for is found in the nature of the traffic they are engaged in, as here shown, there being no likelihood that refrigerators or horse cars would be used as storehouses by consignees; though where the justice comes in is not so easy to see, as the reduction in the mileage rate is calculated to warrant a charge for *all* the time spent by a car away from home. An argument might be found in the fact that the borrowing being all on one side and the lending all on the other, unfair advantage in loading can be taken; but to the private parties the action doubtless seems founded on the rule that might makes right. The poor state of repair in which many, perhaps most, private cars have been kept has always been a strong argument against admitting them to equal privileges; their condition is doubtless, however, much better now than a few years ago.

The figures given in the letter published in the last issue of the *Railroad Gazette*, if applied to the average (5.7 days) here given for all cars, would seem to indicate that the West Shore is favored with a large share of the traffic involving no terminal service above referred to. The average haul of freight on this road is probably over 225 miles, and we may estimate roughly that the east-bound movement is twice as heavy as the west-bound; the average foreign car would then travel 600 miles in its round trip, 300 eastward and 150 westward with a load. At 24 miles actual travel per day, as given in the letter referred to, this would make the time spent in the hands of this particular road 25 days, or (averaged) 12½ days for each

* Statement of summaries taken from table showing the average number of days foreign cars were detained on the West Shore Railroad during the month of December, 1886:

Box cars, common	5.6	days each.
" line	8.4	"
" private	4.5	"
Stock cars	2.7	"
Platform cars	8.1	"
Gondolas	4.3	"
Oil cars	4.7	"
All classes, common	5.1	"
" line	8.4	"
" private	3.4	"
Average of all	5.7	"

of the two shipments carried in the round trip; at 40 miles movement per day the time would be 15 days or 7½ to each shipment. As 600 miles, at 10 miles per hour (including stops), would take only 60 hours, or 2½ days, it seems likely that the cars actually unloaded from the West Shore tracks spent from 5 to 10 or more days on each trip standing still; and this is the point where, as we all know, the reform must begin. It may be added that most accountants will do well to expect to find their own showing considerably less favorable than this, for the West Shore is in many respects exceptionally well situated.

SYSTEMATIC TARIFFS.

The necessity for systematic treatment of business in order that it may adapt itself to the conditions of transportation is the reason which actuates all good railroad legislation. It is also something which should be considered by the traffic department of our railroads much more than is apt to be the case. A tariff rate, whatever its basis, has a certain advantage over a system of special rates, from the mere fact that it is to some extent automatic in its application. Human nature being what it is, the conditions which lead to the granting of a special rate will be bad quite as often as they are good.

We do not now refer to the grosser instances of favoritism or of corruption. These cases are the exception on any well-administered railroad system. We refer to those instances where special rates are given in good faith and with the full belief that they are for the best interests of the road. In any case of doubt the presumption is very strongly against them. The good that they do is seen and felt at once; the evil that they do makes itself felt but slowly and is perhaps not seen at all. The men who can be trusted to balance an unseen evil against a visible and obvious good are few and far between. Almost any man will make the mistake of over-estimating the value of what he sees before his own eyes.

For instance, the investment of new capital in a particular industry or locality is encouraged by a system of special concessions. The result is that the road at once gains a considerable accession of new business which it could not otherwise enjoy. Nor is the old business which has been charged higher rates seriously affected. The old manufacturers feel but slightly the influence of their new competitor. They may perhaps try to meet the increased competition by a reduction in price, and thus actually increase the volume of their own business. In any event, they cannot withdraw their plant which has been invested along the line of the railroad. This is the visible and tangible result of the special rate. It seems to be wholly good. But in point of fact, though the old manufacturers may for the time being increase the volume of the business at low prices, they cannot afford to do so permanently. Though they will continue to use their old plant, they will not renew it as it gradually wears out. They will prefer to invest their capital in new places where they are not handicapped by the possibility of unfair rates. There will be a check to the development of the less favored business, which results in a loss to the railroad no less real than if the business were actually destroyed. The fact that the loss is less obvious may blind the eyes of the local agent; it may commend the policy to the directors, if, as too often happens, the active men among them are more interested in swelling the balance sheet for the year than in building up the permanent prosperity of the company and the localities which it serves. But it ought not to blind the eyes of a traffic manager who desires a really sound and honest development nor to meet the approval of the investors who have the permanent rather than the temporary interests of the property at heart.

Of course, the attempt at systematic tariffs may be carried too far. It may be carried to a point where the proposed system would stop the development of business and produce bad economy for the railroads and the public alike. The tendency of legislation is to go to this extreme; to prescribe arbitrary rates by act of the legislature, or to insist in the courts that they should be based on cost of service. But the fact that this extreme is so obviously bad should not blind us to the dangers of the other extreme. The system of charging what the traffic will bear has been so abused at times that a great many impartial men who really understand the subject and see that rates should be based on value of service, and that value of service is measured by the chance for developing new traffic, are nevertheless disposed to say that it is worth while to accept a somewhat worse principle for the sake of having it more systematically applied.

This feeling is widespread, and it is one which must be taken into account by railroad men. It is what gives force to the agitation for railroad regulation by legislative authority. As long as such agitation is the work of mere extremists, it does not have much effect. Such men are generally too few in number to secure a majority for any distinct plan of action; and when they do succeed in securing a majority they pass laws of such a character that they either remain a dead letter or have to be repealed. But when they have on their side a number of men of calmer views, the resulting laws are less impracticable and have a stronger force behind them. The Inter-state Commerce law, in spite of one or two exceedingly unfortunate sections, is a case in point. It represented a protest from the public sentiment, more or less enlightened, of a large part of the community, against the system of special rates for individuals. Scarcely any two men agree as to how far they would go in prohibiting the practice. But it is probable that the same average public sentiment which passed the bill would accept any system which the railroads might have to offer, provided only that it was a *system*. We believe that the car-load rates under the new classification, however much complained of, will be accepted and acquiesced in by the general public; not because they are perfect in themselves, and not because they are founded on any particularly just distinction, but because they furnish a practical means for taking certain questions out of the hands of the local shipper and local freight agent in each individual case, and deciding them once for all between the general management on the one hand and the general public on the other.

A Hint from the Brake Trials.

The series of brilliant trials just concluded at Burlington has especial interest as an exhibition of the development of the train brake, and it marks a long step in the application of continuous brakes. It is eight years since the remarkable experiments of Mr. Westinghouse and Captain Douglas Galton put the problem of continuous brakes on a scientific basis. It is only five years since Edison patented his electric train brake, which consisted of a disk attached to a car axle and revolving within the field of a big horseshoe magnet, and intended to arrest the train by the magnetic resistance encountered when the circuit was closed. It is not a great while since men stoutly contended that the automatic brake was an evil because it stopped trains. The undoubted result of the Burlington trials will be the speedy application of continuous brakes to freight trains, and the use of electricity to acutate them, for emergency stops at least. The delicacy and precision with which the brakes can be manipulated by electric attachments has hardly been suspected until these trials.

Another result of the trials is to call attention again to the question of common action among the railroad companies for experiments and tests. Interchange of cars is forcing this subject forward as regards car couplers, and it will probably soon come up in relation to heating apparatus. But there are other matters, not directly involved in the interchange of cars, which could well be investigated by the railroads in common.

Individuals and companies have long labored with a fine scientific spirit to perfect our knowledge of railroad appliances in all directions. The Altoona laboratory is a steady source of knowledge. The Master Car-Builders' and Master Mechanics' associations have done an invaluable work in determining standards and improving appliances, and their investigations have owed much to the liberality of various companies in providing place, appliances, labor and power.

Of course it is in this same way that by far the greatest progress must be made in future. The most fruitful research must be carried on by individuals working privately. The conditions of anything like competitive tests or experiments are not often favorable to close and accurate investigation. Men cannot be set to thinking to order with the best results; nor would it be practicable or desirable to establish a general railroad bureau of tests and investigations. A bureau organization is open to the danger that its members become attached to theories and wedded to old ways; in its nature it is narrowing and breeds prejudice. The French Academy has done its work in the conservation of the French language and literature, but progress has been made in spite of the Academy. On the other hand, there are always questions for experiment and study which are so large in their scope and so expensive to carry out that individuals cannot undertake them and railroad companies are very reluctant to; and it is to deal with such questions that concerted action among the railroad companies is almost necessary. The Chicago, Burlington & Quincy has made it possible to carry out a most valuable series of experiments, the cost of which might well have been shared by several of the railroad companies; and it would be well to consider an arrangement for undertaking other investigations in common, specially fitted men to be detailed for special studies, and the labor and expense to be divided somewhat in proportion to the benefit to be derived.

Probably the results of the experiments on tight and slack coupling are not yet convincing to all those who are most interested in the subject, and it is not likely that the coupler tests shortly to take place will settle the matter.

A series of experiments to accurately determine train resistance under different conditions of speed, grade and curvature ought to be undertaken. This is perhaps one of the most important investigations that could be made. Starting with the valuable body of knowledge of the subject already accumulated, we might hope, by thorough experiments now, to arrive at laws that would be indisputable.

It is needless to multiply subjects for such experiments. There are only too many of them.

The Commission and the Fourth Section.

We have no disposition to say or do anything which will increase the difficulties of the Inter-state Commerce Commission; but we cannot refrain from expressing surprise at the course which they have taken with regard to the short haul section. At first they were liberal in suspending it provisionally for large classes of traffic. They now announce that they will be unable to make such suspensions in the future except as the cases have been examined one after another. In other words, they cannot continue to suspend the operation of the law on the same grounds which at first were sufficient.

It is easy to see the practical reasons which actuated them; it is not easy to see where they find their legal warrant. The law said nothing about provisional suspensions. It said that railroads might be exempted from the operation of the act in special cases, after examination. It left it to the discretion of the Commission to define what was a special case, and what constituted an examination. At first the Commission construed these powers most liberally—more liberally, we are free to say, than the language of the act seemed to us to warrant. When they did once take that position, we had a right to expect that they would continue to do so. If the language of the act warranted them in doing so at first, it warranted them in doing so afterward. If they now say that they are not justified in continuing their original course, and attempt to take refuge under the language of the act, it amounts to a confession that they at first acted in disregard of those provisions.

They would probably answer that they were guided by the necessities of the case; that a sudden application of the law would have thrown the business of the country into confusion, and that the temporary suspension gave the railroads a chance to adapt themselves to the new conditions. All this may be true. To a certain extent it undoubtedly is true. But if this is the real ground for the difference the commissioners should take that ground openly and squarely, and not resort to an interpretation of the law which they had, temporarily at least, abandoned.

The elasticity of the Inter-state Commerce law is in some respects a great blessing, but in others it is a great danger; and if the Commission interprets it differently at different times it is likely to prove, on the whole, a danger rather than a blessing. Trade will adapt itself sooner or later to almost any restrictions, however awkward, provided they are reasonably certain in their operation. If they are more vague and indefinite the process of adjustment may not be quite so hard at the first moment; but the hardship will last longer and the final adjustment will be less complete. If there were no doubt as to the meaning of the act, railroads and shippers alike would be face to face with the alternative of submitting to it or of having it repealed. But, just so far as there is any such doubt, each party will think that somebody else is to blame for the hardships and evils which arise under the operation of the law. Already we hear from many quarters complaints that the railroads are trying to make the law odious. In some cases there may be real ground for this view; but generally it arises from the fact that the shipper interprets the law in one way and the railroads in another. The more chance there is for this honest difference of opinion, the more serious will be the difficulties which may arise from it.

In taking two distinct positions as to the extent of their power to suspend certain portions of the act, the Commissioners have greatly increased this element of uncertainty. The shippers will demand that the railroads shall act as though the Commission were able to give full and prompt relief where the law bears hard,

The railroads will be compelled to act with the knowledge that the Commission cannot, or will not, grant such relief in the future. We fear that the Commission, in their anxiety to avoid a crisis at the outset, have increased rather than diminished the friction which will constantly arise in the immediate future. If they, within sixty days, take two contradictory positions with regard to their own powers, how soon may we expect any consistent series of decisions, either from the Commission or from the courts, with regard to the respective rights of railroads and shippers under the act?

The proposed new constitution of the Master Mechanics' Association is much longer and more elaborate than the present one. The word "American" is omitted from the title, and the statement of the objects of the association, the duties of the officers, the order of business, etc., are much more carefully and fully expressed. The election of officers is arranged to come the very last thing in the annual meeting. The 24 o'clock system of time notation is used. Some interesting new points are shown by the following extracts:

The objects for which this association exist are:

To promote the advancement of knowledge in the construction, repair and performance of all machinery and mechanical appliances directly used in railway work.

MEMBERSHIP.

There shall be four classes of members, known as active, associate, junior and honorary.

Persons eligible for active membership are those having charge of the design, construction and repairs of railway rolling stock, including and above the rank of general foreman, and (preferably) the engineer and superintendent of each firm and company in North America building locomotives. However, each firm may choose from among its employés their representative members, the number being limited to two. This clause should not be understood as preventing their chief draughtsman joining as a junior member.

In the case of general foremen employed on railways, their names must be presented for membership by a superior officer.

The number of associate members shall not exceed one-tenth of the total number of active and junior members combined.

Persons eligible for junior membership are chief draughtsmen or others in charge of the drawing office attached to railway shops or locomotive works, also junior employés in railway service, who have taken successfully an engineering course in an acknowledged college or technical school; but who may not yet be in responsible charge of men or new work. Any one member may recommend a junior, the election being referred to the Executive Committee, whose decision shall be final. Junior members are not entitled to privilege of a vote, and their entrance fee and annual assessment shall be but one-half the amount due from an active or associate member ($2.50 for juniors, $5 for others).

EXECUTIVE COMMITTEE.

The executive committee shall consist of four members in addition to the three chief officers, who hold position on that board ex officio. Their term of office shall be two years, retiring in rotation (only the first two elected in 1887 to retain their position during 1888).

The duties of the Executive Committee are to exercise a general supervision over the interests and affairs of the Association; decide upon the amount of the annual assessment; to call, to prepare for and conduct general conventions, and to make all necessary purchases, expenditures and contracts required to conduct the current business of the Association; but it shall have no power to make the Association liable for any debt to an amount beyond that which at the time of contracting the same shall be in the Treasurer's hands in cash, and not subject to prior liabilities.

SUBJECTS FOR DISCUSSION.

The president shall designate two or more associate members, whom the secretary, in writing, shall request to contribute suitable papers for the next meeting, the subjects being left to their own discretion, although it shall be in order for the standing committee on subjects to print in the annual volume a list of suitable subjects as a help to associates in making a selection.

The following tables of earnings in April, 1887, as compared with previous years, have been deduced by *Bradstreet's*:

66 roads.	Increase per cent. 1887 over 1886.	1887 over 1885.	1887 over 1884.
Mileage	4.1	6.6	10.0
Gross earnings	15.1	15.0	7.5

Earnings per mile.

	Roads.	1887.	1886.	1885.	1884.
January	66	$375	$322	$366	$3 6
February	66	350	338	321	335
March	70	442	397	407	413
April	66	412	373	386	422

Percentage of Difference in Earnings per mile for 1887 compared with

	1886.	1885.	1884.
January	+16.7	+2.4	+5.3
February	+ 3.2	+9.	+4 5
March	+11.3	+8 6	+7.
April	+10.4	+6.7	−2.3

April earnings per mile.

Roads.		1887.	1886.	1885.	1884.
Grangers	12	$357	$352	$376	$396
Central western	19	442	397	393	438
Eastern	5	455	366	404	390
Trunk line	4	457	435	419	444
Southern	16	402	241	363	389
Southwestern	7	481	397	458	478
Far-western	3	397	363	347	500

Percentage of Difference between the Earnings per mile, April, 1887, and the Same Month in

Groups.	1886.	1885.	1884.
Grangers	+ 1.4	− 5.	− 9.8
Central western	+11.4	+12.4	+ .9
Eastern	+24.3	+12.6	+16 6
Trunk-line	+ 5.	+ 9.	+ 2.9
Southern	+17 9	+10.8	+ 3.3
Southwestern	+21.1	+ 5.	+ 7.
Far-western	+ 9.3	+14.4	−25.8

It should be borne in mind that the business of the Southwestern roads was seriously interrupted by the strikes in March and April last year. Taking the April earnings per mile of all the 66 roads as compared with other years and as compared with the previous months in the same year, it is impossible to arrive at any other conclusion concerning the influence of the Inter-state Commerce law upon earnings, than that it has had little effect one way or the other.

The American Institute of Electrical Engineers is proceeding energetically to establish a fund for permanent quarters, where it can have a meeting place and begin to build up a library and a technical collection. Nearly $4,000 has already been subscribed for the purpose. The spirit of this brisk young society is commendable, and no doubt it will succeed in providing itself with a home which will be pleasant and profitable. There is, however, a larger aspect to the subject. A union engineering library has been more or less talked of for some time, and several of the technical journals have lately discussed the topic. There are now many scientific and technical organizations with headquarters in New York, whose interests are closely allied, and who have much in common in their labors and in their literature. As they now have no common plan of organization, they are wasting a good deal of energy, and as their libraries and collections grow they will waste more. The American Society of Civil Engineers has a comfortable house and a valuable library, but its meeting room is crowded on ordinary occasions and it is frequently entirely inadequate to the Society's needs.

Why should not the Civil, Mining, Mechanical and Electrical Engineers and the societies of the Architects and the Chemists unite in making a home of the arts and sciences sufficient to their needs and creditable to the city? With their combined resources they could soon have a well-arranged and well-catalogued library, and a commodious hall for use in common, while committee rooms and smoking rooms would provide for the informal intercourse of off-nights.

There is no doubt that such a project would be aided by public-spirited citizens outside of the societies if such aid were sought for. In the American Society of Civil Engineers there has always been a strong and proper spirit against asking any such aid; but the society might, with credit, and no loss of self-respect, share in the advantages of a house and library such as are suggested here, even if they were partly the gift of individuals not members of either of the scientific organizations.

The Colony of Victoria has decided to hold a Centennial International Exhibition commencing Aug. 1, 1888, and ending Jan. 31, 1889, in celebration of a centenary of the settlement of Australia.

The circular closes: "In view of the remarkable growth of Australasia in all things relating to population, production and general distribution of wealth among all classes, the facilities for rapid, economical and easy transit, and its many other advantages, the Commissioners confidently invite all desirous of extending their commercial relations with these rapidly extending communities to exhibit the fullest and most complete representations of their new products, skilled industries and arts, at the Centennial International Exhibition, Melbourne, 1888."

Every one who visited our centennial remembers the very creditable and interesting display of the Australasian colonies, and as we will doubtless soon be holding another world's fair, interest as well as gratitude should urge us to do what courtesy we can to their exhibition. There is also another very potent reason for our being well represented there, for in addition to the custom we receive from that country for such articles as locomotives, cars and bridges, our line of steamers from San Francisco to Australia has built up a very comfortable market for our merchandise, mostly manufactured articles, which have averaged for the last two years a value of about $11,000,000, or nearly $3 per capita.

Our engineering societies and manufacturers should call the attention of Congress to this exhibition, as there are few countries where such articles as they both have for sale are likely to meet with a better demand.

Both Adelaide and Sydney are connected with Melbourne by railroad, and before next year the line to Brisbane will be completed. The building used for the exhibition of 1880 will have annexes covering about 24 acres added to it and no charge will be made to exhibitors for space. Applications for space should be made by or before Aug. 31, but it is requested that applications should be sent in as early as possible.

In consequence of a proposed act prohibiting women from working at "pit brows," a delegation of 24 women and four miners, the first in their working clothes, were sent to London by their sisters in the same occupation to call on the Home Secretary and protest against what they considered an unwarrantable interference with labor. They were accompanied by some members of Parliament, Mrs. Park, "Mayoress of Wigan," and other sympathizers, and it was set forth that their work was preferable to that in cotton mills, glass-houses, etc.; also that 6,000 women laboring in Northumberland, Durham, Lancashire, and part of Yorkshire, besides those in Wales, would be deprived of employment when there was no other opening for them.

Their wages were "from 2s. 6d. to 1s. 6. per day; for pushing boxes along, 9s. per week was paid, working six days a week." "Some of the girls walked 3,000 miles a year for that 9s., and got up at four or five in the morning." The testimony was that their morals and habits were good, equal to any other class of female labor in Lancashire, and this labor was made easier than it was years ago.

The *Mexican Financier* states that work has been commenced on the Vera Cruz harbor improvements, and that the new company intends carrying on the construction with all possible dispatch.

The cost of discharging freight at Vera Cruz, in connection with the high charges of the Mexican Railway, are throwing a great deal of the traffic of the City of Mexico and the table land onto the Mexican Central. It will be necessary not only to improve the port of Vera Cruz, but to reduce the charges on the Mexican Railway, which, according to the late report of Her British Majesty's Consul Baker, of Vera Cruz, are as follows:

	Per ton mile. Pence sterling.
Foreign goods	7.50
National goods	4.15
" " for export	1.71
Government material	2.26
Pulque	3.70

This is about all the traffic will bear.

Mr. F. R. F. Brown, Mechanical Superintendent of the Canadian Pacific, read before the Institution of Mechanical Engineers (London), May 16, a paper describing the locomotives designed by him for the service of his line. The *Railroad Gazette* published, May 6, a description and illustrations of the consolidated class of these engines. As they are good examples of American practice Mr. Brown's paper called out a pretty thorough discussion. A batch of five engines of the "S. A." class cost $5,205 each. These are "American" locomotives, 17 × 24 in. cylinders and 5 ft. 2 in. driving wheels; weight on truck, 30,900 lbs., and on drivers, 53,900 lbs., in working order. The cost was 2.44 pence per pound, against 5.57 pence per pound for a locomotive lately built in the shops of the London, Brighton & South Coast Railway.

The policy of the Dominion government of Canada, which has hitherto overruled the local acts of the provincial government of Manitoba, granting charters to lines other than the Canadian Pacific, has again been confirmed by a vote in the Dominion parliament. The result is that for the present the Canadian Pacific retains control of the lines of access to Manitoba, and the efforts of the lines south of the border to tap that region are defeated. Considering the enormous outlay made by the Canadian Pacific to traverse an unproductive region to reach the wheat and stock growing country, this protection seems not altogether unjust; but the people of Manitoba will doubtless not rest contented until they get some competing line.

As has been foreseen, the color question comes before the Inter-state Commission. A colored citizen of Alabama charges the Georgia Central with having discriminated against him on account of his color in ejecting him from a first-class car. On the other hand a white man complains to the Commission that he was not allowed to ride in the "Jim Crow" car because of *his* color. The colored man wants $20,000 damages; what the white man wants does not appear. Both may claim that in one sense the circumstances and conditions are substantially similar, while in another sense they are substantially different.

The Secretary of the Master Car-Builders' Association has issued a pamphlet containing the various standard dimensions, forms of construction, etc., recommended by the Association during the past twenty years of its existence. The pamphlet contains 28 octavo pages and 5 folding plates, and is a very modest expression of the admirable work done by this Association.

We are requested to state that the Master Car-Builders' Association Committee on the Best Form and Construction of Car Roofs will be glad to receive models and blue-prints of designs. They may be sent to the Chairman of the Committee, Mr. J. D. McIlwain, West's Hotel, Minneapolis, Minn.

On Decoration day the Manhattan Elevated carried 571,412 passangers, or 14,000 more than ever before in one day, and the receipts were $28,570. The average daily passengers for the three months ending March 31 were nearly 430,000, including Sundays.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1887 is given in the current number of the *Railroad Gazette* as follows:

Fort Worth & Rio Grande, since last reported, 8 miles.

St. Paul, Minneapolis & Manitoba, Rutland to Ellendale, D. T., 49 miles.

This is a total of 57 miles for the week, making 1,359 miles reported thus far for the current year. The new track reported to the corresponding date for 16 years has been:

	Miles.		Miles.		Miles.		Miles.
1887	1,359	1883	1,654	1879	661	1875	296
1886	940	1882	3,323	1878	513	1874	537
1885	599	1881	1,574	1877	570	1873	1,171
1884	910	1880	1,590	1876	628	1872	1,797

This statement covers *main track only*, second or other additional tracks and sidings not being counted.

NEW PUBLICATIONS

The *Transactions of the American Society of Civil Engineers* for March contains papers on the Effect of Freezing on Cement Mortar, on Irrigation and on Some Constants of Structural Steel.

The *Sabula Draw by Graphics*. M. A. Howe, C. E. The *American Engineer*, Chicago. $1. This is an analysis of a 360-foot swinging drawbridge. The strains are deduced, both graphically and analytically, and the author states that the paper "has been prepared more especially for engineering students and for those engineers who have not the time to test the accuracy of graphical methods by actual construction." The specifications are given, and sheets of details and strains.

TRADE CATALOGUES.

The Tanite Co.'s Illustrated Catalogue. Published by the Tanite Co., Stroudsburg, Monroe Co., Pa.

This catalogue shows machines adapted to a great variety of work, and gives some information as to the extent of their use in railroad shops. It is regrettable that this information is not fuller. It is stated that the Pennsylvania alone is running 10 emery car wheel grinding machines, and 31 guide bar grinders are in use in the shops of 25 companies. This guide bar grinder or surfacing machine is used with the wheel at the level of the table as a *perfecting* machine, or more often with the wheel slightly projecting *above* the table for more rapid work. Used in this way as a guide bar grinder it does good work in the hands of ordinary workmen who have the knack of moving the guide at an even speed and judging of the cut by an occasional look at the ground surface. The elegant car brass grinder and filleting machine was illustrated recently in the *Railroad Gazette*. The Newman planer is said to have taken a cut of $\frac{1}{16}$ in. over a surface of 100 square inches in 6 minutes and 9 seconds. This, however, is mentioned as an *extreme* cut, and not as an average performance. A list of 7 concerns is given who have in use 14 of these machines, the Pennsylvania having 5.

The writer of the catalogue "assumes it to be a clearly established fact that for the simple removal of metal an emery wheel is cheaper than a file." A study of this question from careful experiments, was published last week in the *Railroad Gazette*, under the title of "The Comparative Economic Value of Emery Wheels and Files." It was written by Mr T. Dunkin Paret, President of the Tanite Company, and is a most valuable essay toward putting "this industry on a strictly scientific basis."

Suits for Infringement of Westinghouse Brake Patents.

A series of suits has been instituted by George Westinghouse, Jr., and also by the Westinghouse Air Brake Company, against J. F. Carpenter, the inventor of the Carpenter brake, for general infringements of patents, including temporary injunctions. The causes will be called up before the United States Court at Keokuk, Ia., on the first Monday in July. The temporary injunction may be called up in June.

These suits are likely to prove of considerable interest to railroad men. The main points in the Carpenter electro-air brake alleged to be infringements, are, it is understood, the couplings and the use of a brake valve having three ports, one to the train pipe, one to the brake cylinder and one to the atmosphere. The suits promise, however, to cover considerable ground, and the evidence is likely to prove interesting reading.

Similar suits have been tried in Germany and England, Westinghouse *vs.* Carpenter, and Westinghouse *vs.* Lancashire & Yorkshire Railway, but in both cases the brakes alleged to be infringements differed considerably from the Carpenter brake as used at Burlington, and in neither case was any electrical attachment used. The decisions, therefore, which were on the whole adverse to the claims of infringement, have only a side bearing on this case. Mr. Carpenter states that he has a complete answer to the case.

The Railroads of the World.

From the *Archiv für Eisenbahnwesen*, we extract the following statements of the development of the railroads of the world from the end of 1881 to the end of 1885:

Europe, from 107,333 English miles to 121,205 miles, or 12.9 per cent. America, from 118,662 miles to 155,757 miles, or 31.3 per cent. Asia, from 10,621 miles to 13,791 miles, or 29.7 per cent. Africa, from 2,871 miles to 4,285 miles, or 49.2 per cent. Australia, from 5,257 miles to 8,045 miles, or 53.1 per cent.

According to this the network of the railroads of the world had increased from the end of 1881 to the end of 1885 by a total of 58,339 miles, and consequently at the latter date had total length of 303,083 miles. America shows the greatest increase, and possesses more miles of railroads than the rest of the world combined. The next greatest increase is in Australia.

According to a table published by the *Archiv* last year, the average cost of construction per English mile is in Europe $120,008 and in all other countries $63,113. By this the railroads of Europe had, at the end of 1885, a total value of $14,545,569,640, and those of all other countries of $11,478,866,214, making a grand total of $26,024,435,854.

Of the European states Germany possesses the most extensive railway system. The other states come in the following order: France, England, Russia, Austria-Hungary, Italy, Spain, Sweden, Belgium, Holland, Switzerland, Denmark, Roumania, Norway, Portugal, Turkey in Europe, Greece, Servia.

Relative to the area Belgium has the densest network of railroads in Europe. The other states follow according to notation: England, Holland, Germany, Switzerland, France, Denmark, Italy, Austria-Hungary, Spain, Portugal, Sweden, Roumania, Norway, Greece, Russia, Servia, Turkey in Europe. Of the German states, Saxony has the closest network of railroads, being second in this respect in the world.

Relative to population Sweden has the most miles of railroads in Europe. Then come in rotation: Switzerland, Denmark, France, England, Norway, Germany, Belgium, Holland. Austria-Hungary, Spain, Italy, Portugal, Roumania, Russia, Greece, Servia, Turkey in Europe.

Foreign Technical Notes.

PROPORTIONATE SUPPLY OF TENDERS.

The Saxon state railways, instead of using a special tender for each of their locomotives, have ascertained what proportion of tenders is necessary to keep the locomotives in active service, and keep the proportion between locomotives and tenders down to the figures called for, with the result of needing a much smaller capital idle in tenders than would be the case on the one engine one tender plan.

The resulting number for the whole system is 636 locomotives and 563 tenders.

It is found that the following table represents the relative proportion of engines and tenders in active service:

	In service.	Reserve.	In repair.
Locomotives	73.5 per cent.	10.5 per cent.	16 per cent.
Tenders.....	83.0 per cent.	10.5 per cent.	6 5 per cent.

Hence there are in service 636 × 0.73 = 467 locomotives, and 563 × 0.83 = 467 tenders, and a saving in interest and in rusting out on the value of 73 tenders results, an item by no means inconsiderable.

LIFE OF RAILS ON GRADES AND IN TUNNELS.

The Italian railroads have found the loss of their rails by wear on the head to be for grades of 1 in 250 (21 ft. per mile) one millimetre per 16,000,000 tons of traffic; the German roads find the mean traffic varying from 10 to 20 million tons per millimetre of wear, and the Paris, Lyons & Mediterranean has got as high traffic as 28,000,000 tons per millimetre, assuming a mean of 15,000,000 for light grades and curves. The Austrian *Railroad Journal* gives the following comparative table of the increase of wear on Italian roads due to grades and tunnels, the last column showing the percentage of increase being added by us:

Place of Trial.	Grade. Feet per mile.....	Wear in millimetres		Actual difference of wear between observation and calculation in millimetres.....	Percentage of increased wear.....
		Observed.	Calculated.		
					Per cent.
Open road.....	14 2	2.72	2.86	0 06	2¼
Ariano tunnel.....	7.9	3.55	2.00	1 55	77½
St Lorenza and Christina tunnels..	8.9	3.29	2.22	1.07	48¼
St. Domenico tunnel.....	11.6	6.40	2.78	3.65	132

TIE CONSUMPTION.

The tie consumption of six of the principal railroad systems of France in the years 1883 and 1884 amounted to 6.76 per cent. per year of the total in the track, all the ties being preserved either with creosote or with sulphate of copper.

Three-fourths of the supply of ties was drawn from French forests and the rest from abroad, and as it appears that this about exhausts the French capacity for production, and most other European countries are also nearly at the end of their capacity, it is evident that the use of metal ties in great part will be an absolute necessity in France before long, although, up to this time, little use has been made of them in that country.

American Economists on Railroad Questions.

The second annual meeting of the American Economic Association brought forth a number of papers of interest upon economic questions of live concern. Prominent among the topics discussed was that relative to railroad regulation, especially in the United States. Prof. E. J. James, of the University of Pennsylvania, the chairman of the Standing Committee on Transportation, took strong grounds in favor of the Inter-state Commerce law, as being a necessary step in the governmental supervision and regulation of railways. Many of the abuses of railway management show no tendency to right themselves, but are rather growing worse under present conditions. Some of them can be remedied by proper legislation. The long and short haul clause of the bill, he urged, deserves a fair and full trial, and should not be suspended even temporarily, except where the necessity is clear and pressing. The outcry against its enforcement he regarded as the very best proof that the charges brought against the railway management of the country in the Cullom report were substantially true, and that the abuses should be remedied. The control of the canals of the country by the railway corporations to so large an extent as at present was, he said, to be deprecated as practically depriving certain sections of the country of the benefits of water competition where it would otherwise exist.

The speaker argued further in favor of the systematic improvement and development of the natural and artificial waterways of the country as an indispensable condition of a thoroughly efficient and cheap system of transportation. In conclusion the professor said, speaking of the results of the bill: "We shall, I believe, be in a much more favorable position to solve some of the most vexatious questions of the problem than any other government which is now busying itself with it. We are coming more and more to regard the railroads of the country as one system. I believe that one effect of the present bill, if it is allowed to exist long enough, will be to bring more and more of the roads of the country under one management; in a word, to hasten combination, and with increasing combination will come increased loss of control. With a larger experience will come a clearer insight into the underlying principles of the business and a more reasonable policy in every respect. If the future should show that this particular bill was not a wise one, that it did not cure evils or that it created new ones, we can console ourselves with the idea that this was the only way to obtain a juster view."

Dr. Edwin R. A. Seligman, of Columbia College, New York, read a paper upon the long and short haul clause of the Inter-state Commerce law, with special reference to the classification of freight and discrimination. He said that the phrase "charging what the traffic will bear," which is often used by railroad managers, is not a good one, as while it suggests a low charge on cheap classes of freight, it also suggests that the higher classes of freight should be charged as high a rate as can be secured on them. The general principle of classification of freight is legitimate, but this does not justify all existing rates. Local discriminations arise from a desire on the part of a railroad to develop its business or to meet the efforts of a competition. The "long haul" is of vital importance to the public, as whatever tends to eliminate distance is in the direction of the development of the whole country. From this point of view strict pro rata charges per mile are impracticable. It is absolutely necessary that freight which is brought a long distance should be borne at a less rate per mile than when there are but a few miles of distance. Even on the principle of the relative cost of service this graduation of rates is justifiable. The system of basing the railway charges on the value of service rather than cost of service gives rise to important questions. Although there is a liability to abuse in the charge on freight according to relative value, the principle is a correct one, but must necessarily be carefully watched in the interest of the public. If the railroads have unrestricted power to put their own interpretation on the relative value of freight the method will virtually give them the power of taxation. It is true that differential rates tend to nullify certain geographical advantages of some localities, but these localities have no vested proprietary right in situation, and after all the true aim is to eliminate distance and to tend toward equality. The principle that the charges for a long distance should not be less than between any two points on the way is a safe and fair one. Demagogues are wrong when they insist on the enforcement of the short-haul principle in all cases, but the railroads are wrong when they commit greater infractions of the principle than are necessitated by competition. When there is water competition a considerable reduction must be made in through traffic. In no country in the world where the railroad rates are subject to government inspection is there an absolute enforcement of the short-haul principle. It is improbable that the Inter-state Commerce Commissioners will interpret the act in the sense that the words "under substantially similar circumstances and conditions" justify all existing differential rates due to competition. This would practically emasculate the law. A strict enforcement of the short-haul clause would most certainly result in general discontent and speedy repeal. The safety-valve consists in the discretion afforded to the Commissioners. Under a system of free competition among private railways the principle of the volume of service, or charging what the traffic will bear, is the only rational method calculated to give the most efficient service and the greater profits. But the existence or possibility of the abuse of power requires the restriction of this unlimited liberty in the public interest. The reconciliation of the railways and the public interest can take place only through the interposition of public authority. The public authority must lay down the rule of equal treatment as the fundamental doctrine, but must recognize the principle of value as a reason for departing from the doctrine in individual cases. Omission of either duty necessarily entails injustice or inefficiency.

Mr. Simon Sterne read a paper on phases of the railway question in Europe. The discussion finally led up to an interchange of views in reference to the relative advantages of state and private control of railways. Professor Hadley, of Yale, argued in opposition to government ownership of railways on the basis of foreign experience, particularly in Germany. Mr. Edward Atkinson contented that both state and nation should keep their hands off the railroads. Prof. Ely, of Johns Hopkins, argued that government control of railroads would not, as a whole, develop as many abuses as private control, while Mr. Simon Sterne held that, while the matter of state ownership in the United States was not to be considered, much might still be done by government supervision to remedy the evils arising from preferential rates.

Massachusetts Employers' Liability Law.

Below will be found the essential portions of the employers liability law recently enacted in Massachusetts:

SEC. 1. Where, after the passage of this act, personal injury is caused to an employé, who is himself in the exercise of due care and diligence at the time,

(1) By reason of any defect in the condition of the ways, works or machinery connected with or used in the business of the employer, which arose from or had not been discovered or remedied owing to the negligence of the employer or of any person in the service of the employer and intrusted by him with the duty of seeing that the ways, works or machinery were in proper condition; or

(2) By reason of the negligence of any person in the service of the employer, intrusted with and exercising superintendence, whose sole or principal duty is that of superintendence; or

(3) By reason of the negligence of any person in the service of the employer who has the charge or control of any signal, switch, locomotive engine or train upon a railroad; The employé, or in case the injury results in death the legal representatives of such employé, shall have the same right of compensation and remedies against the employer as if the employé had not been an employé of nor in the service of the employer, nor engaged in its work.

SEC. 2. Where an employé is instantly killed or dies without conscious suffering * * * the widow or next of kin * * * may recover in the same manner * * as if the death of the deceased had not been instantaneous, or as if the deceased had consciously suffered.

SEC. 3. The amount of compensation receivable under this act in cases of personal injury shall not exceed the sum of $4,000. In case of death, compensation in lieu thereof may be recovered in not less than $500 and not more than $5,000, to be assessed with reference to the degree of culpability of the employer, or the person for whose negligence he is made liable; and no action for the recovery of compensation shall be maintained, unless notice, etc., is given within thirty days, and the action is commenced within one year.

SEC. 4. Whenever an employer enters into a contract, either written or verbal, with an independent contractor to do part of such employer's work, or whenever such contractor enters into a contract with a sub contractor to do all or any part of the work comprised in such contractor's contract with the employer, such contract or sub-contract shall not bar the liability of the employer for injuries to the employés of such contractor or sub-contractor, by reason of any defect in the condition of the ways, works, machinery, or plant, if they are the property of the employer, or furnished by him, and if such defect arose or had not been discovered or remedied, through the negligence of the employer or of some person intrusted by him with the duty of seeing that they were in proper condition.

SEC. 5. An employé or his legal representatives shall not be entitled under this act to any right of compensation or remedy against his employer in any case where such employé knew of the defect or negligence which caused the injury and failed within a reasonable time to give, or cause to be given, information thereof to the employer, or to some person superior to himself in the service of the employer, who had intrusted to him some general superintendence.

SEC. 6. Any employer who shall have contributed to an insurance fund created and maintained for the mutual purpose of indemnifying an employé for personal injuries, for

which compensation may be recovered under this act; or to any relief society formed under the acts of 1882, as authorized by the act of 1886, may prove, in mitigation of the damages recoverable under this act, such proportion of the pecuniary benefit which has been received by such employé from any such fund or society on account of such contribution of said employer, as the contribution of such employer to such fund or society bears to the whole contribution thereto.

SEC. 7. This act shall not apply to injuries caused to domestic servants, or farm laborers, by other fellow employés, and shall take effect Sept. 1, 1887.

President Perkins to the Iowa Commission.

The following letter explains itself, and is given in full be cause of its presentation of some fundamental principles:

Chicago, Burlington & Quincy Railroad Co.,
PRESIDENT'S OFFICE,
BURLINGTON, Ia., May 17, 1887.

E. G. Morgan, Secretary Iowa Railroad Commission:

DEAR SIR: I have before me a copy of the Glenwood coal rate decision after the rehearing. I regret that the commissioners have reached what I cannot believe to be a correct conclusion; but I desire to say that instructions have been given to adjust our coal rates in Iowa upon the basis which has been fixed. In thus adopting, against our own judgment and most emphatic protest, rates which have been declared by the commissioners to be reasonable, the company is actuated by a desire to do everything possible to satisfy the people and the governor, as well as the commissioners, of its intention to carry out their wishes, as well as by the hope that experience may lead to a closer agreement of views between us on the grave question of what constitutes a reasonable rate. It is my belief that the cost theory of railroad rates is so fallacious that it cannot be generally adopted; and it has always seemed to me that the essence of the railroad transportation lay in its tendency to lessen the influence of distance on prices, bringing all producers and all consumers near to each other. But the effect of recent legislation and of the cost theory of rates on which it is based, is to maintain in transportation this influence of distance on prices where it was before railroads had done so much toward the annihilation of time and space. If for the last twenty-five years, the railroads east of Chicago had been required, by the rule the commissioners now apply to the coal traffic of Iowa, to do all the business, local as well as through, on the same margin of profit, it is safe to say they could not without practical ruin to themselves have cut that margin so much as they have, in fact cut it upon the vast aggregate of western products passing through Chicago; and probably the region west of there would have been much more slowly developed. The public must of course judge as to what policy in railroad transportation is best calculated to serve its interests; and the railroads must of necessity conform, but in my opinion no more serious error could be made than the general adoption of the cost theory of railroad rates. States have been developed and cities have been built up on the idea that the values, and not the cost, should be the basis of railroad charges; and to reverse the practice and base rates on cost alone, means, I think, very serious consequences. It is doubtful if railroads will continue to be created by private enterprise, when, if ever, the cost, instead of the value, becomes the general measure of rates; because there is nobody ready to guarantee that they shall receive cost; and men who have saved money will not embark it in business enterprises where the possible profit is thus limited, while there is no limit to the loss except the amount of investment. Very respectfully.

C. E. PERKINS, President.

THE SCRAP HEAP.

Didn't Know Wealth When They Saw It.

In 1827 there lived in Washington County, Pa., a farmer by the name of McCook, an uncle of the famous Gen. Anson G. McCook, the present secretary of the United States Senate. McCook's farm was situated on the old national pike, eight or ten miles out of Brownsville. In attempting to dig a well a short distance back from the pike he struck a large flow of natural gas. This, by accident, became ignited, and the flame it gave forth scared the horses passing on the pike, and many runaways occurred. This went on for some time, until the authorities in that section passed an ordinance stigmatizing it as a nuisance, and compelling McCook to suppress it as such, which he did. Thus what the citizens of Pittsburgh now consider the greatest discovery of the nineteenth century, just half a century ago the citizens of Washington County considered the greatest nuisance.—*Pittsburgh Times.*

Can Ride Free in Spite of the Law.

Brakeman—But don't you think that a dollar and a half a day is rather small pay for 18 hours' work on the top of a freight car? Superintendent—But you forget that we charge nothing for traveling. Let's see, you ride something like 100 miles daily, and it doesn't cost you a cent.—*Omaha World.*

The Indian has no Show in the Wild West.

Indians are no longer allowed to ride on the cars of the Southern Pacific, the object being to prevent a spread of small-pox should it become epidemic.

The Disrespectful, Ruining Railroad.

One feels like borrowing the anti-railroading rhetoric of a Ruskin as he stands on Old Hadley street these days, and glancing Northampton way sees gangs of men tearing up the ancient and historic sod. The Massachusetts Central road, to be sure, may be a thing to be desired for the development of the commonwealth, but by what fatality the surveyor's chain has been run directly through the heart of one of the quietest, quaintest, most elm-guarded towns in the state is not for us to say. The route decided upon runs within a few rods of the site of the Russell house, where the regicide Whalley lived in concealment so many years, and several old buildings and at least one large elm will have to be removed. This is, indeed, like piercing a little Lake country. The old street is to be cut in two. Then will come a great noise and rush of steam, and a new Hadley, for the old one will be dead. But sentiment cannot battle against a corporation. Stock must pay dividends, which green old streets do not. So it goes:

> A pictured thought in harmony or verse
> Fills the weary soul as it fills the purse;
> So stands it, proof 'gainst natural decay,
> Wrapped in the robes of profitable gray.
> But from the art the gain in gold you sever,
> The thing of beauty is *but* joy forever,—
> Such joy as memory fondly revels in,—
> Joy at the thought of beauty that has been.

Thus Old Hadley street is destined to go the way of all the beautiful spots of the earth that come in the way of commerce. Its stately avenues of trees and rural simplicity will be indeed a joy forever to those who cherish the memory of it. Already we hear that the humble price of building lots has gone up. We have no quarrel with it. Why, indeed, should we have? The law of supply and demand is inexorable.—*Springfield Republican.*

The Land Grant Railroads.

Secretary Lamar has issued an order requiring the land grant railroad companies of the country to show cause why an order should not be issued restoring to the public domain the lands now withdrawn from settlement and held in indemnity.

Non-Transferable Tickets in Germany.

The Supreme Court of the German Empire at Leipsic has approved of the sentence of three months' imprisonment of a man convicted of buying and using a non-transferable railroad return-ticket. This was a test case, as Prof. Dr. Rud vs. Ihering, an eminent jurist, had declared that a return-ticket, notwithstanding that "not transferable" was printed upon it, was not only meant for "the" bearer, but for "any" bearer.

An Effective Danger Signal.

The Port Jervis *Gazette* says: May 18 a hand-car on the Erie near Hampton, ran over and exploded a torpedo, the car being derailed and Andrew Chase, a track hand, thrown to a great distance and severely injured.

A Texas Train Robbery.

Twelve men robbed a train last week on the International & Great Northern road at McNeil Station, 15 miles from Austin, Tex. About 100 shots were fired as a preliminary intimidation, and a few individuals were unfortunate enough to be very slightly hurt. It took the robbers about a half hour to take away all they could, and then they sent the train along on its journey and divided their booty—some $4,000. A sheriff, with a large posse and a pack of bloodhounds, started out on the trail of the robbers, and at last accounts it was thought probable that one or more of the latter would be captured.

Strategic Railroads in Germany.

A memorial is before the German Parliament in regard to the construction of new railroads for strategic purposes, the laying of second tracks and the direct connection of Upper Alsace and South Germany without trespassing on Swiss territory. The neighboring states have developed their network of railroads in this respect, especially France, which has made extraordinary exertions for increasing her facilities for transportation of large masses of men as well as freight to the eastern frontier. In view of this Germany can no longer hesitate to put herself on an equal footing in this respect, if the timely concentration of troops for the protection of the frontier is to be assured and the country guarded against foreign invasion. To this end the military authorities of Germany suggest the expediency of double tracks for many important railroads in Alsace-Loraine, Prussia, Bavaria, Würtemberg, Baden and Hesse. Further, they recommend the erection of additional platforms for embarking and disembarking large numbers of men, as well as the construction of side-tracks for the loading and unloading of war material and freight at certain points. The Imperial Government proposes to grant for this purpose $16,800,000, of which nine millions shall be appropriated the current year.

Nerve.

A few years ago, during the construction of the Bar Harbor branch of the Maine Central road, one of the bosses shot and killed an Italian laborer. He was arrested and a revolver was taken from him, but later he escaped from jail, and nothing was heard from him till the other day, when the officer who made the arrest received a letter from the shootist, dated in Canada, asking for the return of that revolver! *Rockland (Me.) Opinion.*

Protection of Passengers.

A new ground for suit against a railroad has just been established in France. A painter named Board while traveling on the Paris-Lyons road was attacked by a robber and seriously wounded. He sued and got damages, the company being held responsible because the construction of the cars did not afford sufficient protection. The Judges decided that there was a genuine contract between the passenger and the company, the ticket constituting the written instrument, and the railroad people were bound by it, not only to bring the man to his destination, but also to afford him protection during his journey; and they refused to entertain the question that the company were obliged to conform to the rules of the administration in regard to the model of the cars.

Don't Judge a Man by his Trousers.

A Pullman conductor on the Delaware, Lackawanna & Western had an experience some time ago that he will not soon forget. Coming out of the depot at Elmira he was confronted by a dude with an eyeglass and a big cane, who said, "Aw, going to Buffalo to-night?" "Bet your life we are," answered the conductor rather brusquely, as he hurried to his car. When he got to New York he was suspended for ten days for incivility to passengers. The dude was a spotter.

The Coke Strike.

The principal event of interest since our last issue relating to the coke strike now pending was the meeting of the furnace men, which was held at the Monongahela House, in Pittsburgh, on the 25th ult. Representatives from the Shenango and Mahoning Valleys, Pittsburgh and Wheeling were present. It was a special meeting, and had been called to decide upon united action in a protest against the present price of coke. E. E. Wheeler, of Sharon, Pa., was appointed president, and Robert Bentley, of Youngstown, Ohio, acted as secretary. After a long discussion on matters of interest to those present at the meeting, the following resolutions were unanimously adopted:

Resolved, That a committee of five be appointed by the chairman of this meeting to make a demand upon the coke syndicate that the price of coke be reduced to $1.50 per ton, f.o.b. at mines, from and after June 1.

Resolved, That the committee be authorized to make a demand upon transportation lines for lower rates of freight than now prevail.

The resolutions, as adopted, were presented to the coke syndicate at a meeting held at its headquarters on the 27th ult. Contrary to general expectation, the syndicate declined to grant the demand made by the furnacemen, that the price of coke be reduced to $1 50 per ton. They gave as a reason that, on account of the present strikes among the employés, that they had no coke to offer at any price, but when work was resumed and the present difficulties adjusted they would take the matter under consideration. On the 23d ult., W. J Rainey, a large operator in the region, notified his men that he would grant the advance. This is the first serious break made by the operators. Mr. Rainey is not a member of the syndicate, and the latter body condemn his action in very strong terms, but claim it will have no effect in a settlement of the strike.

Two members of the General Executive Board of the Knights of Labor have been investigating the coke strike, with the avowed object of ordering the men in if their finding as to the facts sustains the arbitrators' award. The feeling seems to prevail that the strike is not likely to be of long duration.—*Iron Age.*

Railroads for China.

The following is an abstract of the memorial on which the Chinese decree was recently issued sanctioning the construction of new railways north of the Peiho. It was addressed by the Emperor's father to the Empress Regent, and is interesting as a Chinese opinion on railways:

The introduction of railways has been under discussion for several years. Some have argued in their favor and others adversely, so that no definite conclusion has been come to. The memorialist, I-Huan (the Seventh Prince), has frequently heard these oft-repeated opinions, and his own views were at one time opposed to the innovation; but since the recent campaign, and since he himself visited the Northern seaports, he has become aware that these adverse opinions are not in accordance with the true interests of the state. When the Prince, with Li-Hung-Chang and Shan-Ching, inspected the seaports, the question of railways frequently formed the subject of their deliberations. Moreover, when he presided over the Tsung-li-Yâmen, he obtained a clear insight into affairs, and considered thoroughly the means of remedying the difficulties of the time.

Tseng-Chi-Tse (the Marquis Tseng) has been Ambassador in foreign countries for eight years, and has himself studied the railway systems of other nations, their utility in providing for the transport of troops and material, their immense benefit to the people, the large issues they involve, and the very great advantages to be derived from them, and he has seen that they not only afford protection to the frontier and a stimulus to the trade of the people, but at the same time are in no way attended with danger or hindrance to the state. Since his appointment to the Tsung-li-Yâmen he has devoted much thought to this matter, and made many inquiries, which have resulted in his entire agreement with the views set forth in this memorial. In our deliberations we have duly recognized the fact that the circumstances of China have from ages past differed widely from those of other nations; and while we are fully cognizant of the many and great advantages to be derived from railways, we have not been blind to the financial difficulties or to the objections that might exist to an unsightly network of railways spread like a web over the land, as is the case in many countries. On the other hand, when we consider the important advantages to be gained in the facility and rapidity with which troops and material can be moved from place to place, we are convinced of the desirability for taking the best measures in this direction. One should not look at only one side of a question. * * * In the autumn the new war vessels ordered from England and Germany should reach China, and next year the memorialist, I Huan, will proceed to the seaports, and with Li-Hung-Chang and his colleagues, arrange for the formation of the first division of the navy. They can at the same time inspect the railway. If it is found to be useful and free from objections, they would suggest that similar plans be put into operation in the various mining districts of the country.—*London Iron Trade Exchange.*

The Chinese have declined to subscribe money for the new Chinese railroad, and in consequence the Comptoir d'Escompte of Paris has contracted to lend the Chinese government 3,000,000 taels for the purpose.

Sault Ste. Marie Water Power.

It is announced in a dispatch from Detroit that the difficulties concerning the rights and franchises for the water-power at Sault Ste. Marie have been at last overcome by the purchase of the interests of both parties to the suit now pending in the Supreme Court, and that the project is likely to go on to completion. It is proposed to build a canal parallel with the ship canal and west of it. The water power obtained will be almost unlimited, and if the scheme goes through the result will undoubtedly be the location there of a large milling business.

The Mining Engineers and Mohammedan Pilgrims.

Messrs. Cook & Sons, the well-known tourists' agents, besides "personally conducting" the Mining Engineers to Utah and Montana for their summer meeting, have arranged to conduct, the Mohammedan pilgrims of India to Arabia, issuing 1st, 2d and 3d class tickets from Bombay to Jeddah and return for 90, 60 and 45 rupees. A Mohammedan doctor accompanies the pilgrims, and special arrangements will be made for ladies. Pilgrims' valuables can be deposited at Bombay and drawn at Jeddah. Price of return ticket paid to heirs in case of demise *en route.*

The Inter-state Law's Effect.

Receiver McNulta, of the Wabash Railway, in speaking of the Inter-state law, said last week: "The car movements of this road fell off 55 per cent. within a week under the influence of the law. There has been, however, a gradual increase of business from that time. The business of the road has been partially, or even wholly, lost in some localities, and as much or more gained in others. The tendency of the law, in my opinion, is gradually to augment the business of the trunk lines and then that of the longer or roundabout roads. While there has been an increase of revenue on this road, I do not think it is in any way attributable to the operation of the law; but on the contrary, I think the earnings of the road would be much greater if the law were not in force."

Street Railroad Franchises at Auction.

The first sale for street railroad franchises under the new law, which requires them to be sold by auction to the highest bidder, took place in New York on May 1. One company, which wanted to build a road on Twenty-eighth and Twenty-ninth streets, had to bid over 28 per cent. of the gross earning for the first five years, and over 31 per cent. a year thereafter for the franchise. Another company agreed to pay 35 per cent. of the gross earnings for the privilege of building a road through Fulton street. It is understood that Jacob Sharp has no interest in either company.

A Gaseous Nickname.

T. W. Lee, the new General Passenger Agent of the Lake Erie & Western, has christened the road the "Natural gas route," the line running through the principal towns where gas has been found in Indiana and Ohio.

Stealing a Money Chest.

A daring theft of a railway money chest has just been committed on the railway between Warsaw and St., Petersburg (Russia), the ingenuity of which is worthy of being related. It was the custom to send to St. Petersburg, on a certain weekly day, the receipts taken at the stations, the money being deposited in the guard's van in a heavy iron chest. Recently, on the money being transmitted as usual, the guard noticed, at the Ostraff station, that the chest, containing one hundred thousand roubles, was missing. A hole had been cut in the floor of the van, but not large enough to admit of the passage on the chest, though the thief might have escaped through it. On

inspecting the contents of the van, however, attention was drawn to a trunk of unusual size, which belonged to a Jew who had joined the train at Dunaberg. When lifted into the van this trunk was very heavy, but now a great deal lighter. On the owner being questioned on this point his replies were so unsatisfactory as to make the railway officials decide upon opening the trunk, and in it the money chest was found intact. The Jew has since confessed that two men were concealed in the trunk—the scheme being, as effected, to transfer the money chest to it whilst the train was in motion, and, breaking up a plank in the floor, escape at the next station, whilst their accomplice proceeded to his destination, where he could claim his "luggage," a plan which, it will be seen, was nearly successful.—*Railway News.*

MacVeagh and Garrett.

At the annual banquet given at the Pennsylvania Steel Works, at Steelton, Pa., on May 31, the Hon. Wayne MacVeagh and Robert Garrett were funny as follows: Wayne MacVeagh said: "Mr. Garrett is not handsome, as you all can see, but he talks from the shoulder. He and I and Cowen have been engaged in some negotiations in the sale of the B. & O. Railroad. [Laughter.] But the main difficulty was to find a purchaser. I don't see why the stockholders shouldn't know it." Mr. Garrett, interrupting: "MacVeagh, you've been giving me away ever since you have been my counsel. Gentlemen, since I have been at the head of the Baltimore & Ohio Road we have been engaged in a great contest to enter the city of Philadelphia [a voice, 'and New York:'] yes, New York. Shortly after the decision to get into Philadelphia I went abroad. I was criticised in England for leaving home at that time, but I said, 'we feel safe because we have retained Wayne MacVeagh to prove to the city council of Philadelphia that one railroad could serve it better than two, but he hadn't the talent nor cheek to prove it.'". [Laughter.] Mr. MacVeagh: "You stockholders may as well hear it now as at any time. Major Bent (General Manager of Pennsylvania Steel Co.) is the purchaser of the B. & O. It is to be cut up and divided among the Steel Company."

Didn't Burn Through to the Woman.

A remarkable accident is reported from Roann. A lady bound for Detroit boarded an east-bound Wabash train and entered the smoking car by mistake. When the conductor entered to take up the tickets he detected smoke, and a moment later the lady was enveloped in flames, which were smothered with great difficulty. She had seated herself on a lighted cigar stub, which had ignited her dress and even the celluloid bustle which she wore.

A Dig from Philadelphia.

It is believed that when the millennium is due the last parties to join in the universal peace will be the railroads.—*Philadelphia Inquirer.*

The Horseshoe Curve Accident.

Two passenger cars in a west-bound express train on the Pennsylvania road were wrecked at the well-known "Horseshoe curve" in the Allegheny Mountains west of Altoona, Pa., on the evening of May 27, by being struck by a derailed car of an east-bound freight train which was met just as the derailment occurred. Eight passengers were killed or fatally injured, and six others hurt. The cause of the derailment of the freight car is reported to have been a broken wheel.

So long as double-track roads are run such disasters will not only be possible, but occasionally occur, thousands of trains meeting at full speed every day; and we see that the best roads are exposed, along with the others. So long as the Pennsylvania does a heavy freight business, and runs all sorts of cars from hundreds of different roads, and loaded to the very limit of their capacity, the feeling of security engendered by the careful oversight that it exercises over its own rolling stock must necessarily be somewhat modified, so far as this kind of accident is concerned.

Union Station at Memphis.

Collis P. Huntington has just bought a large lot of ground on the river front at Memphis, Tenn., for $130,000. Work is to begin immediately upon a union station for five railroads centering in that city.

TECHNICAL.

The Car Shops.

The Burton Stock Car Co. is having built 100 cars at the Lehigh Car, Wheel & Axle Works, Catasauqua, Pa., for a road which runs between Chicago and the seaboard. These cars will be equipped with the Westinghouse air brake. The Laconia Car Co., Laconia, N. H., is also building a number of cars for the Burton Co., constructed especially for the transportation of horses.

Bridge Notes.

Bids are requested for the substructure and superstructure of a wrought iron lift or pivot bridge to be placed over the Hackensack River at River Edge, Bergen County, N. J. Span over all 62 ft. Address Jno. G. Zabriskie, Court House, Hackensack, N. J.

The county commissioners of Fulton County, Ga., ask for bids for the erection of an iron bridge of 3 spans, 120 ft. each, and about 500 ft. of trestle work on the old Western & Atlantic road, on the Chattahoochee River, between De Foor's Ferry and the present Western & Atlantic bridge. Bids received until July 10. John D. Coogan, Clerk of Commission.

The Boston Bridge Co. will build four iron bridges on the Ashuelot division of the Connecticut River road.

Manufacturing and Business.

The manufacturers of indurated fibre goods have combined to do business through the Union Indurated Fibre Co., in order to secure a maintenance of card rates by dealers and for the mutual protection of dealers and manufacturers. A notice to this effect is signed by the Indurated Fibre Co., Portland, Me.; John H. Conant, Watertown, Mass.; American Indurated Fibre Co., Mechanicsville, N. Y.; Oswego Indurated Fibre Co., Oswego, N. Y.; the Indurated Fibre Co., Lockport, N. Y.; the Western Indurated Fibre Co., Winona, Minn.

The Wainwright Manufacturing Co., 65 and 67 Oliver street, Boston, report excellent business, and many and large orders ahead. During the month of May they sold their corrugated tube feed-water heaters in the following places: Six to New York City, 2 to Montreal, 1 each to Buffalo and Troy, N. Y.; Athol, Chelsea, Greenfield and Waltham, Mass.; Manchester, N. H.; Greenwich and Willimantic, Conn.; Truro, Nova Scotia, and Yokohama, Japan.

Iron and Steel.

The foundry of the Murray Iron Works at Burlington, Ia., which was burned on May 1, has been rebuilt. The building is 300 ft. by 110 ft.

The Pratt & Whitney Co., of Hartford, Conn., is making 150 Gardner improved machine guns for the Italian Government. The company has 525 men at work.

A company to be known as the Houston Car Wheel and Foundry Co., has bought ground near Houston, Tex., and will build a foundry there immediately.

The Rail Market.

Steel Rails.—The market has been quiet in the East and active in the West. There was a sale of 20,000 tons by an Eastern Pennsylvania mill to the San Antonio & Aransas Pass Railroad on private terms, 22,000 tons to the St. Louis, Arkansas & Texas, at a little over $42 at St. Louis. In addition to these sales there have been three smaller lot sales, aggregating a little over 10,000 tons, also at St. Louis, and a few blocks for the Northwest, one for 5,000 tons. Also 3,000 tons by Eastern Pennsylvania mills, for delivery at Brunswick, Ga., and 20,000 tons English rails for a Mexican road. Nominal quotations, $38@$39 at eastern mills.

Old Rails.—Only one sale of 300 tons double heads reported at $21.50. One lot of tees in port is being offered at less than $21, and a lot of double heads at $21.50.

Scrap.—Market continues very dull, with foreign offered at $20@$20.50 and yard scrap at $22@$22.50, with choice lots available at $23.

Rail Fastenings.—Spikes, 2.40@2.50c., new; angle fish bars, 2.15@2.25c.; steel angle bars, $2.25@$2.30; bolts and nuts, 3.10@3.20c.; and bolts and hexagon nuts 3.25@3.30c.

Rolling Mills and the Coke Strike.

The three rolling mills of the North Chicago Company are extremely short of coke, owing to the strikes in Pennsylvania. It is stated that the company's two mills in Chicago will shut down in about a week, and that the mill in Milwaukee cannot run a much greater time. The closing of the three mills will throw out 4,000 employés.

Slopes of High Embankments.

On the Scarborough-Whitby Railway there are two embankments of 73 ft. and 90 ft. respectively in height. To provide against too rapid sliding of the slopes, each of these embankments was divided into three horizontal sections. The upper section had a slope of 1½ to 1, the middle section a slope of 2 to 1, and the lower section a slope of 3 to 1.

A New Ocean Steamship.

The Arrow Steamship Company is now building at its own yard in Alexandria, Va., a 5,200-ton ship, the Pocahontas, which it hopes to launch next November. This ship is to be 540 ft. long, 40 ft. beam and 46 ft. deep. She is the first of a proposed line of fast steamers which the company hopes to build, to run from New York to some English port, to carry passengers and mails only. She is to be built on entirely new designs, invented and patented by the engineer of the company, Mr. Fryer. Her keel is a built-up beam 510 ft. long, 5 ft. 6 in. deep at the bow, 10 ft. 6 in. deep at the stern and 12 in. thick. On this keel rest 68 transverse plates of steel modeled to the cross sections of the ship, which take the place of ribs and beams. To these the sheathing is riveted. These section plates are traversed by five longitudinal galleries, which run the whole length of the ship, and are built up of iron and steel plates. These, with the transverse plates divide the vessel into numerous cells, the whole making a very stiff structure. The state-rooms and main saloon are of unusual size and elegance, and there will be numerous novel appliances for comfort and safety. One of the many new devices introduced is the emergency steering apparatus. This consists of two screws placed in a transverse tube 10 ft. in diameter, 40 ft. back from the stem. Normally this tube is closed by valves at either end. The ship is expected to attain a speed of at least 25 miles, and as she will carry passengers only, her stay in port will be very short. The enterprise is purely American, and if it is successful, it will revolutionize the ocean passenger business. It is a colossal experiment, and will be watched with much interest.

Sault Ste. Marie Bridge.

The Sault Ste. Marie bridges consist of ten 240-ft. spans over the St. Mary River, a 398-ft. swing bridge over the present ship canal, and the proposed canal on the United States side, a 220-ft. swing bridge over the proposed canal on the Canadian side, and two 104-ft. lattice spans over the North Channel. The contractors for the superstructure are the Dominion Bridge Co., Lachine. The contractor for the masonry is R. G. Reed and the Chief Engineer P. Alex. Peterson. The bridge is to be ready for trains by Nov. 30, 1887.

New Switch Movement.

Mr. H. K. Whitner has recently patented a device for the application of a toggle movement to switches. He uses two pairs of toggles, which are attached to the opposite sides of the switch rod and move it in either direction by a direct pull from the switch lever.

A New Railway Spring Testing Machine.

A new testing machine for trying springs of all dimensions has been designed and constructed for the workshops of the Southern Railway of France. As described in the excerpt minutes of the proceedings of the British Institution of Civil Engineers, it consists of a vertical steam cylinder, supported by four columns, by which it is connected to a block based on a wooden platform let into the ground. The ends of the springs to be tested are supported on two small four-wheel trucks, which run on a line of rails on the top of the block, while the buckle on the centre is directly under the ram or piston-rod.

The cylinder is 24 in. in diameter and has a stroke or vertical range of 31 in. The total maximum pressure exerted with steam of six atmospheres is about 17½ tons, applied to the middle of the spring. Steam is admitted above the piston through an orifice of very small section, and the pressure of the steam as the piston descends is always in equilibrium with the resistance of the spring. By means of an indicator in communication with the upper end of the cylinder, and by a suitable connection, a diagram may be taken showing the pressure of the steam at every point of the stroke, the abscisses being the measures of deflection, and the ordinates the measures of the load. The cost of the machine completed and erected was $840. In the course of the year 1885 it served to test ten thousand springs. It is capable, in case of need, of testing two hundred springs per day.

Iron and Steel Pool.

A pool composed of all the sheet iron and sheet steel manufacturers in the United States is in process of formation in Pittsburgh, Pa. One function of the pool will be to fight against undervaluation of imports.

Swedish Railroads.

Mr. C. P. Sandberg has issued a chart of the railroads in Sweden, giving some interesting facts. There are some 6,000 miles, which cost on an average £5,000 sterling per mile, running trains at an average speed of 20 miles per hour. The rails used weigh from 35 lbs. per yard to 64, and the speed varies from 12 miles an hour to 30. The heavy construction and high speeds are on the state railroads. The population of Sweden being 4,500,000, there are 13½ miles of railroad per 10,000 inhabitants, being more railroad per head of population than any other country in Europe.

The coast line, intended to connect the network of south Sweden with the northwest of the Gulf of Bothnia, and a line from Lulea on the Gulf of Bothnia across to Ofoten are under way. This latter line will open railroad communication to the famous ore deposits of Gallivara.

Simplon Tunnel.

Both Swiss National Councils have unanimously resolved to devote the subvention of the 4½ million francs legally guaranteed for an Alpine railroad in West Switzerland to the Simplon project.

A German "Motor."

On April 21, a locomotive built on Rowan's system in the machine shops of Messrs. Ganz & Co., in Budapesth, Hungary, made an experimental trip, starting from the depot of the Hungarian State Railroad. The same system is already in use in Berlin, Copenhagen, Antwerp, etc. This locomotive is a small one, furnished with an upright boiler and four wheels. It occupies but a small space. It has only one axle on the rear, and a pivoted truck forward. By these means short curves can be easily passed. The machine gives out no smoke nor steam. The roof of the passenger car contains a shallow condensor, which by the simple cooling of the air, converts the steam into water, the latter then being forced back into the boiler by the feed pump. But one man is required for the service on the locomotive and one on the passenger car. On the experimental trip a speed of about 15 to 18 English miles per hour was attained, and the working of the engine satisfactorily demonstrated in every respect.

The Progress of the Iron and Steel Trades in England, 1837 to 1887.

Among other jubilee proceedings the *London Iron Trade Exchange* publishes a review of this industry which has been to a great extent the foundation of England's prosperity. The average production of blast furnaces, through the introduction of the hot blast and the use of larger furnaces has increased from 140 tons each to 500 tons per week, while the coal consumption has fallen from four to two tons, per ton of iron made.

The introduction of a railroad system led to a largely increased employment of iron, so that when Bessemer brought his invention before the world, English ironmasters were making about 1,000,000 tons of rails a year. The first Bessemer rails were rolled at the Atlas Works, Sheffield, in 1861. In this country the first rails were rolled in 1867.

The early prices of steel rails on board vessels, for this country, as given by Mr. Rorr, were as below:

	£	s.		£	s.		£	s.
1863	18	9	1868	12	12	1872	13	8
1864	17	2	1869	11	6	1873	16	9
1865	16	7	1870	10	7	1874	13	2
1866	14	10	1871	11	6	1875	9	2
1867	13	10						

No improvement has been made in puddling, aside from the use of gas, and the quantity produced in 1883, 2.8 million tons has fallen off, but not more, the writer thinks, than other branches of the iron trade have.

In steam hammers we have the following: Le Creusot, 100 tons; St. Chamond, 80 tons; Krupp, of Essex, 60 tons; Woolwich Arsenal, 40 tons. Charles Cammel & Co., of Sheffield, are building an hydraulic forging press of 4,000 tons. In armor plate the mills of Sheffield are capable of rolling armor 18 inches in thickness.

The English iron trade has received great assistance from ship building. The first iron vessel was launched in 1810, but the first ocean going iron steamer was not launched till 1832. Puddled steel was used in 1850 for ship plates, but the doubt as to its uniformity prevented its general use, and it was not until the introduction of the Siemens-Martin process that its use became general, and in 1880 the amount of steel used in shipbuilding amounted to 35,000 tons, while 50 years ago the production of steel in England probably did not exceed 10,000 tons.

The percentages of increase in the manufacture of iron in 1853 to the present time, by various countries, has been: United States, 471 per cent.; Great Britain, 244 per cent.; German Zolverin, 60 per cent.; Austria, 130 per cent.; Belgium, 217 per cent.; Sweden, 51 per cent. It is stated in conclusion that England still stands as she did fifty years ago, as the chief iron making country in the world: and, though her relative position has lately fallen, through the loss of old markets, the obvious remedy is to open up new ones.

Paper Car Wheels.

The paper car wheel was the invention of Richard N. Allen, a locomotive engineer, afterward Master Mechanic of the Cleveland & Toledo Railroad, who took for his aim in life the production of a better car wheel than those in use. His first set of paper wheels was made at Brandon, Vt., in 1869, and after much scoffing he was graciously permitted the use of a wood car on the Central Vermont road, under which they were tested for six months. The Pullman Palace Car Co., in 1871, gave the first order for a hundred wheels; ten years after the Allen Paper Car Wheel Co., with great shops at Hudson, New York, and Pullman, Ill., produced and sold 13,000 in a single year. One of the set first experimented with under a "sleeper" is shown at Hudson, with a record of 300,000 miles' travel.

It is the body of the wheel only which is of paper. The material is a calendered rye-straw "board" or thick paper made at the Allen Co.'s mills at Morris, Illinois. This is sent to the works in circular sheets of twenty-two to forty inches diameter. Two men, standing by a pile of these, rapidly brush over each sheet an even coating of flour paste until a dozen are pasted into a layer. A third man transfers these layers to a hydraulic press, where a pressure of five hundred tons or more is applied to a pile of them, the layers being kept distinct by the absence of paste between the outer sheets. After solidifying under this pressure for two hours the twelve-sheet layers are kept for a week in a drying-room heated to 120° F.; several of these layers are in turn pasted together, pressed, and dried for a second week, and still again these disks are pasted, pressed, and giving a third drying of a whole month. The result is a circular block, containing from 120 to 160 sheets of the original paper, compressed to 5½ or 4½ in. thickness, and of a solidity, density, and weight suggesting metal rather than fibre. The rough paper blocks are turned accurately in a lathe, whence shavings like leather and a cloud of yellow dust fly off, to a diameter slightly greater than the inner circle of the tire. The hole in the centre is also made on the lathe, and after the paper has received two coats of paint to prevent moisture working its way within, the cast-iron hub is pressed through, by the aid of the hydraulic press, and the wrought-iron backplate is clamped on. The suasion of enormous hydraulic power now drives the paper centre into the tire, by help of the bevel.—*Harper's Magazine.*

Large Purchase of Coke Lands.

It is reported that Dr. David Hostetter and Ralph Bagaly have made a purchase of a large tract of coking-coal lands in Western Pennsylvania for $1,600,000.

Troy Lake Mining Company.

This company has been organized to operate mineral lands in Canada, with their headquarters in Chicago. It is composed wholly of Chicago parties, and has an office at No. 175 LaSalle street. The company's property is located about 30 miles above Kingston, Ontario, on the Rideaux canal, and consists at present of 200 acres of land, with mining leases on about 800 more acres. The company has just commenced opening up a property, and expects by the first of July to

enter the lists as shippers of ore. Their assays, it is claimed, made by the Union Steel Company, of Chicago, show a larger per cent. of metallic iron than has heretofore been assayed in this country, so far as is known, assaying from 67.79 to 70.21 pure metallic iron.—*American Manufacturer.*

It is said that many of the incorporators of the Troy Lake Company are interested in the new company controlling the Vermillion Iron Ore & Railroad Company.

Natural Gas and Oil in Ohio.

During the past 18 months 182 natural gas and oil companies were incorporated in Ohio. Applications for charters now average from 2 to 3 per day.

Special Cars for the Transportation of Acids in Italy.

The managers of the Italian Mediterranean Railroad have had a design made for an open two-story car, to be lined with lead, in which to carry carboys or vessels containing sulphuric or other acids largely used in commerce. The principal manufacturers of acids favor the adoption of this new style of car, which has been approved by the government. Each car will carry 10 tons, or 88 carboys of 110 kilograms each.

Pullman Car Axle.

The Pullman Co. have issued an order that a standard size iron or steel axle, 5 in. diameter at the wheel seat, and 4½ in. at the middle, shall be used with the No. 7 truck. They find some old style axles still running only 4 in. diameter at the middle, and do not consider them safe, especially with 42-in. wheels.

Train Telegraphy.

The Consolidated Railway Telegraph Co., of 13 Park Row, New York City, successor to the Phelps and the Edison-Gilliland companies, now has its system in operation on the New Jersey division of the Lehigh Valley road, there being an operator on three passenger trains each way daily, who, in addition to his duties for the railroad company, takes messages from the passengers, who have patronized him steadily thus far. By an arrangement with the Western Union Company messages are sent to all points at an advance of only 10 cents each above the regular office rates. Superintendent Phelps, in conjunction with two of the electricians of the Edison-Gilliland company, who remain with the new concern, have been busy perfecting the plans by which all the best features of both the old systems are combined in the new, and we understand their efforts have been highly satisfactory.

An Electric Motor in Car Shops.

The Chicago, Burlington & Quincy is putting in at the Aurora car shops a Sprague electric motor of 7½ horse-power to operate the traveling car table which carries the cars from one shop to another while in process of building.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulations of Railroads.

In Illinois a railroad, by its charter, was required to establish and maintain a depot within a certain town, and by a contract with the town to stop all its trains at that depot. The company established a depot at a certain place, but after some years, it built a depot in another portion of the town, and the trains no longer stopped at the old depot. The Supreme Court awards a *mandamus* against the company, holding that while the company has a large discretion in locating its road, yet when it has once exercised that discretion, and erected its depot in the town, these questions are irrevocably settled, and it cannot thereafter abandon its road, or any part of it, without rendering its franchise liable to forfeiture. The Court therefore orders the railroad to stop all its passenger trains at the old depot.[1]

In New Jersey the Chancellor refuses to compel a railroad to perform an agreement to build a fence on its line.[2]

In Illinois the Supreme Court rules that no appeal lies from the state Board of Equalization in their valuation of property of railroads or others for taxation in an action for delinquent taxes except on the ground of fraud. And as to what is meant by fraud the Court says: "The fraud which may be urged against the assessment must in general terms have either consisted in a willful disregard by the members of the board of a known duty, for the purpose of producing a result which could not have otherwise been produced, or in their denying or preventing the taxpayer from doing something that he might lawfully do, and, but for being denied and prevented by them, would have done, which would or might have had the effect to cause a lower valuation of the property to be made. No mere discrepancy in judgment as to the value of the property, between the members of the board of equalization and the judge of the county court, however gross, could be sufficient at law to impeach the valuation of the board."[3]

In another case, in the same state, a recovery of taxes against a railroad is sustained by the Supreme Court.[4]

In a case from Arkansas the Supreme Court of the United States holds that a board of railroad commissioners appointed to appraise the property of railroads may disregard an exemption which the Legislature had no right to make.[5]

In Pennsylvania the Supreme Court holds that under the General Railroad Act of April 4, 1868, railroads have large branching powers, the exercise of which depends solely upon the discretion of the president and directors of the road; and in a case free from a willful abuse of the power, the courts will not interfere. Therefore a company which is chartered to build a line of road "about three miles long," and which builds such a road as a link in a trunk line, may, in its discretion, build a branch 6 miles long to a local freight station, without issuing additional stock or filing supplemental articles. The Supreme Court also decides that the Act of May 21, 1881, authorizing extensions by railroads whose lines do not exceed 15 miles in length, does not conflict with the provisions of Section 9 of the Act of April 4, 1868, giving branching powers to railroads chartered thereunder.[6]

In a case appealed from Arkansas, the Supreme Court of the United States holds that a railroad track is within the phrase "lands, tenements or other possession" in a statute of that state relating to trespasses.[7]

In Connecticut it is held that the statute of that state declaring that "hereafter no new highway or portion of a highway shall be constructed across any railroad at grade," intends that although a highway may have been previously laid out, partially constructed and even built upon, if it has not actually been completed for public use across the rails of the railway, such crossing shall not thereafter be made. It is of no moment that the plaintiff had given to the city permission to construct the crossing. Private contracts may not put limitations upon legislative power to protect life. If the crossing had been constructed upon the faith of such permission, and in the absence of any prohibitory statute, the Legislature, by virtue of the same power, could have ordered a removal the next day.[8]

In Illinois the Supreme Court decides that the General Railroad Act of 1872 of that state gives railroads incorporated under it an absolute right to construct their tracks across any highway in the state. It is only where the railroad is to be constructed along or lengthwise of the highway that the consent of the municipal authorities having charge of the highway is necessary.[9]

In Indiana the defendant had signed a subscription to stock of a railroad, it being a condition that the road should be completed to Decatur within a specified time. In a suit on the note the Supreme Court holds that there can be no recovery without first showing that the railroad was completed to Decatur within the time, but that the defendant cannot vary the words of the contract by parole evidence showing a different agreement than that recited in the note.[10]

During the war, a number of railroad bridges having been destroyed by one of the contending forces, the government, as a military necessity, rebuilt them. The Supreme Court of the United States has just decided that the railroads are not liable to the government for their cost.[11]

Carriage of Goods and Injuries to Property.

In Massachusetts the plaintiff's agent brought a cow to a railroad, connecting with defendant's road, for shipment to Chicago, and signed a shipping agreement, valuing the cow at $75, and freight was paid upon that valuation. The Supreme Judicial Court decides that the plaintiff is bound by the shipping agreement and cannot recover a sum in excess of the valuation stated from the defendant, which received the cow from the contracting railroad and through whose negligence the cow was killed.[12]

In Pennsylvania, the Supreme Court holds that the measure of damages to property from the construction of a railroad is the difference between the price at which the plaintiff's land would have sold before the railway was built, and the price at which it will sell afterward. If it will sell for a greater price afterward, the plaintiff can recover nothing. The purchaser of land through which a right of way has been granted to a railway, already located, by deed duly recorded, can recover no damages for the proximity of the railway to a saw mill which he subsequently builds on the land, or for the inconvenience in getting logs from this and adjoining tract to the mill, caused by crossing the track.[13]

In Illinois, the Supreme Court decides that where the owner of land is restricted by statute, or by the provisions of the instrument under which he holds the title, or in any other binding way, to a particular use of the premises, so that he cannot apply it to another use, the measure of his compensation when the land is taken by condemnation will be its value to him for the special use to which he is so restricted. But where a limitation of the use of the premises was self-imposed, and a restriction was fixed by the will and preference of the owner, and was not binding upon him by the nature of his tenure, the capacity of the land for a use to which it is not put may properly be taken into consideration in estimating its value.[14]

A railroad is liable for obstructing a watercourse by its embankment to the injury of adjoining lands. But the Supreme Court of Indiana decides that a channel made by mere surface water and snow is not a watercourse unless there is ordinarily a moving body of water flowing through it. Therefore, a railroad is not liable in damages for the obstruction of the flow of such surface water.[15]

In Indiana, the Supreme Court holds that though a railroad has a right to burn the dry grass and combustible materials on its right of way, yet it starts such a fire at its peril, and if the fire escapes and damages neighboring property the company is liable in damages.[16]

In Washington Territory it is held negligence in an engineer of a freight train not to stop his train to avoid killing cattle on the track, there being time, as the cattle were running on the track, for him to stop before reaching them.[17]

Injuries to Passengers, Employes and Strangers.

By statute in Pennsylvania, railroads are required to redeem every unused ticket "at a rate which shall be equal to the difference between the price paid for the whole ticket and the cost of a ticket between the points for which the proportion of said ticket was actually used." In a recent case a person on the train tendered to a conductor an unused but expired ticket covering the trip, and the difference in money. There was a rule of the railroad prohibiting conductors from redeeming tickets, but the passenger did not know of it. The Supreme Court holds that the conductor had no right, on his refusal to pay the full fare in money, to treat him as a trespasser and eject him.[18] Even a trespasser cannot be ejected from a train without a reasonable regard for his safety. Following this principle, the Supreme Court of Pennsylvania decides that proof that the plaintiff, although a trespasser, was, in the middle of a dark night, ejected for non-payment of fare, from a train near a station without lights, and inaccessible without crossing another track but pointed out by the conductor, and that, in attempting to cross the track the plaintiff was, without warning, struck by a train and severely injured, is sufficient to send the case to the jury to determine whether the expulsion was negligent.[19]

In Illinois the Supreme Court rules that where a railroad company was guilty of negligence resulting in the death of one who held a stockman's pass and took his place upon its engine by the direction of the engineer, the fact that another railroad company, with whose cars it came into collision, was more culpable than it, cannot avail the company transporting the deceased when sued for the death.[20]

In Pennsylvania, the wreck-master of a railroad, while proceeding on a wreck train to the scene of an accident, received injuries, as a result of disobedience of orders by the conductor and engineer of the train, over whom he had no authority. Afterward, upon receiving money on account of the injuries, from a beneficial society whose payments were guaranteed by the railroad company, he executed a release of damages, under seal, to the railroad company. He then brought suit against the railroad company for damages. The Supreme Court decides that he cannot recover anything.[21]

In Idaho, the Supreme Court holds that a carpenter and a station-agent, both in the employ of the railroad, are not "fellow-servants."[22]

In Pennsylvania, the following notice was posted up by a street railway company in its waiting room: "H. B. McCurdy has been discharged for failing to ring up all fares collected. Discharged employés are not allowed to ride on employés' tickets. C. P. Sorg, Assistant Superintendent." McCurdy sued the company for libel, but the Supreme Court decides that the words do not constitute a libel. The Court says: "The company had a clear right to insist upon the full performance of this duty; it was for many reasons, perhaps, important that it should be faithfully and promptly performed; and the company, apart from any anticipated fraud, might well annex the penalty of a dismissal from service for neglect of this duty. But a failure to perform the duty required might result from mere neglect or inefficiency, or from motives of dishonesty. Failure to ring up all the fares collected, therefore, does not necessarily imply the fraud or dishonesty of the conductor; it does not import the commission of any crime. Embezzlement is the fraudulent application by one of the money intrusted to his care by another; and even if McCurdy did fail to ring up all the fares collected, *non constat* that he embezzled the money. * * * The plaintiff's default in not ringing up the fares, as we have said, might have resulted from his negligence or inefficiency, or from mere mistake or accident, or from his intentional fraud; and if people will draw from the general statement of his discharge on that ground, a merely possible inference of fraud and embezzlement, which the words themselves in their usual signification did not justify, it is certainly not the defendant's fault."[23]

In Connecticut, the Supreme Court of Errors holds that where a railroad company built a bridge over a highway, and was itself guilty of no negligence, and the bridge was built upon such plans and at such height as the borough required, the company is not bound to prevent the highway from being raised, nor to preserve the original space between it and the bridge. Hence where the municipal authorities permitted the roadway under the bridge to be filled up, the railroad is not liable for an injury received by a person coming into collision with the bridge by reason of its height being thus reduced.[24]

In Pennsylvania a girl, thirteen years old, was passing along a street in the daytime. Her attention was attracted behind her; she turned partly around, but continued to advance. After going a few steps she fell into an inlet to a sewer in the sidewalk, at the intersection of two streets, which was uncovered for repairs and unguarded. The inlet was being repaired by the workmen of a railroad, whose roadway occupied the middle of the street. It did not appear who constructed the sewer, but witnesses testified that employés of the railroad frequently cleaned it. The girl brought an action to recover for her injuries against the lessee of the railroad. The trial court held that she could not recover, and the Supreme Court, by an equally divided court, has just affirmed this ruling.[25]

In Oregon one of three young children was killed while walking on a railroad track. The Court, considering its tender years, holds the child not guilty of contributory negligence.[26]

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[1] People v. Louisville & N. R. Co., 8 West. Rep., 347.
[2] Vandorn v New Jersey South. R. Co., 6 Cent. Rep., 543.
[3] East St. L. Connecting R. Co. v. People, 8 West. Rep., 342.
[4] Onio & Miss. R. Co. v. People, 8 West. Rep., 355.
[5] Little Rock & Ft. S. R. Co. v. Worthen, 7 S. C. Rep., 469.
[6] Vallmer v. Schuylkill River R. Co., 6 Cent. Rep., 599.
[7] Iron Mountain R. Co. v. Johnson, 7 S. C. Rep, 329.
[8] New York & N. E. R. Co. v. Waterbury, 3 New Eng. Rep, 860.
[9] County of Cook v. Great Western R. Co., 8 West. Rep., 381.
[10] Low v. Studebaker, 8 West. Rep., 37.
[11] M. So. Pacific R. Co., 7 S. C. Rep., 492.
[12] Hill v. Boston, Hoosac Tunnel & W. R. Co., 3 New Eng. Rep., 916.
[13] Short. Rochester & Pittsburgh R. Co., 6 Cent. Rep., 627.
[14] Chicago, Evanston & L. S. R. Co. v. Catholic Bishop of Chicago, 8 West Rep., 381.
[15] Hill v. Cinn. Wab. & Mich. R. Co., 8 West. Rep., 47.
[16] Indiana B. & West R. R. Co. v. Overman, 8 West. Rep, 385.
[17] Temm v. Northern Pac. R. Co., 13 Pac. Rep., 415.
[18] Arnold v. Pennsylvania R. Co., 6 Cent. Rep., 630.
[19] Arnold v. Penn. R. Co, 6 Cent. Rep., 630.
[20] Union R. & Transit Co. v. Shacklet, 8 West. Rep, 63.
[21] Graff v. Balt. & O. R. Co., 6 Cent. Rep., 633.
[22] Palmer v. Utah & N. R. Co., 13 Pac. Rep., 425.
[23] Pittsburgh, A. & M. P. R. Co. v. McCurdy, 6 Cent. Rep., 721.
[24] Gray v. N. Y. & N. E. R. Co., 3 New Eng. Rep., 807.
[25] Miller v. Pennsylvania R. Co., 6 Cent. Rep., 607.
[26] Cassida v. Oregon R. & Nav. Co., 13 Pac. Rep., 438.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Chicago Burlington & Northern, annual meeting, at the office, La Crosse, Wis., June 8.

Fort Worth & Denver City, special meeting, Fort Worth, Tex., June 22.

Cumberland & Piedmont, meeting, Cumberland, Md., June 10.

Fort Worth & Rio Grande, annual meeting, at the office, Fort Worth, Tex., June 7.

Minnesota & Northwestern, annual meeting, at the office, St. Paul, Minn., June 8.

Ogdensburg & Lake Champlain, annual meeting, at the office, Ogdensburg, N. Y., June 15.

St. Paul & Duluth, annual meeting, at the office, St. Paul, Minn., June 20.

St. Paul & Sioux City, annual meeting, at the office, St. Paul, Minn., June 4.

Illinois Central, meeting, Chicago, June 17.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Little Miami, $1 per share, payable June 10.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Master Car-Builders' Club* holds its regular meetings at the rooms, No. 113 Liberty street, New York, on the third Thursday in each month.

The *Master Car-Builders' Association* holds its annual convention at Minneapolis, Minn., June 14.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The *American Society of Civil Engineers* holds its annual convention at the Hotel Kaaterskill, Hudson River, N. Y., the first week of July.

The *American Railway Master Mechanics' Association* holds its annual convention in St. Paul, Minn., June 21.

The *American Association of Train Dispatchers* holds its annual convention in Boston on June 16.

The *Traveling Passenger Agents' Association* holds its annual convention at Old Point Comfort, Va., on June 14.

The *Western Association of General Passenger and Ticket Agents* will hold a meeting in Chicago on June 8.

Master Car-Builders' Association.

The following notice has been issued:

By order of the President of the Master Car-Builders' Association, the subject of heating cars will come up for discussion at 10 a. m. on the third day (Thursday, June 16) of the annual convention at Minneapolis.

M. N. FORNEY, Secretary.

Buffalo Association of Railroad Superintendents.

This Association was formed in Buffalo, N. Y., last week, for the purpose of mutual improvement and more frequent and general interchange of views. The following gentlemen were present and formed the membership: J. B. Morford, Division Superintendent Michigan Central; D. B. McCoy, Division Superintendent West Shore; George S. Gatchell, General Superintendent Buffalo, New York & Philadelphia; H. Dwyer, Division Superintendent Buffalo, New York &

Philadelphia; P. C. Doyle, General Agent Lehigh Valley; W. J. Murphy, Division Superintendent New York, Lake Erie & Western; George H. Burrows, Division Superintendent New York Central & Hudson River; J. T. Gardiner, General Superintendent Buffalo, Rochester & Pittsburgh; C. Stiff, Superintendent Grand Trunk; W. F. Halsted, General Superintendent Delaware, Lackawanna & Western; F. A. Seabert, Assistant Division Superintendent Delaware, Lackawanna & Western; C. A. Brunn, Division Superintendent New York, Pennsylvania & Ohio; W. B. Coffin, Superintendent Western Division New York, Lake Erie & Western. The following were also elected members: William Stevenson, Superintendent Pennsylvania & New York Canal & Railroad Co.; R. T. Goodman, General Superintendent Buffalo Creek; G. H. Kimball, Division Superintendent New York, Chicago & St. Louis. The following officers were elected for the ensuing year: President, J. B. Morford; Vice-President G. H. Burrows; Secretary, J. F. Burke. Meetings will be held on the third Wednesday of each month in Buffalo.

PERSONAL.

—B. R. Thompson, Car Service Agent of the Union Pacific, has resigned.

—Gilman Trafton, C. E., died on May 25. Mr. Trafton was the engineer of the Louisville Bridge & Iron Co., of Louisville, Ky.

—Julius Wadsworth, a well-known railroad man, died at Middletown, Conn., on May 28. He was one of the promoters of the Chicago, Milwaukee & St. Paul road, and was Vice-President of the company at the time of his death. He was an intimate friend of the late Alexander Mitchell, of the St. Paul road.

—M. de Lesseps is writing his "Memoirs," which are to be shortly published in Paris and will be brought out in English at the same time by Chapman Hall & Co., of London.

It is sad that the success of the Suez canal should be clouded by the dismal prospects of the Panama scheme, and this, too, when De Lesseps is so far advanced in years that he cannot hope to carry any other enterprise to a successful issue.

—Stuyvesant Fish, the new President of the Illinois Central, is the youngest son of Hamilton Fish, ex-Governor of New York and Secretary of State during President Grant's two terms. He graduated from Columbia College in 1871, and entered the banking business. He was thus engaged for several years in England, and on returning to this country went into the office of William H. Osborne, then President of the Illinois Central. In a very short time he became Secretary, Vice-President, and finally President.

ELECTIONS AND APPOINTMENTS.

Arkansas, Kansas & Colorado.—The directors of this new Kansas company are: C. D. Perry, Englewood; Andrew Dienst, D. M. Frost, J. F. Frankey, P. G. Reynolds and C. E. Gallagher, of Dodge City, Kan.

Atchison, Topeka & Santa Fe.—George L. Sands has been appointed General Superintendent, with headquarters at Topeka, Kan., vice D. J. Chase, resigned, to accept other service. Mr. Sands' jurisdiction will extend over the Leavenworth, Topeka & Southwestern and Manhattan, Alma & Burlingame roads.

The incorporators in Illinois are: George W. McCreery, of Kansas City, Mo.; Albert Robinson, of Topeka, Kan.; Emmons Blaine, Benjamin T. Lewis and Frederick I. Gay, of Chicago.

S. W. Manning, New England agent, announces the appointment of D. E. Partridge as Boston Freight and Passenger Agent.

Atlantic & Pacific.—J. H. Scott has been appointed Superintendent, with headquarters at Albuquerque, N. M., vice G. L. Sands, resigned to accept other service.

Baltimore & Ohio.—An order announces that the Superintendents and Trainmasters of the Main Stem, Philadelphia and Pittsburgh Divisions, will perform the duties heretofore belonging to the Inspector of Passenger Service, the latter position being abolished.

J. A. Spielman has been appointed Roadmaster of the Chicago Division, with headquarters at Garrett, Ind., and T. J. Frazier Assistant Superintendent Maintenance of Way, headquarters at Newark, O.

Boston, Concord & Montreal.—At the annual meeting, this week, the old board of directors was re-elected, with the exception that Charles E. Busiee was substituted for Lewis C. Pattee, of Lebanon, N. H.

The directors elected Edward H. Rollins, Concord, N. H., President; Samuel N. Bell, Clerk; Edward D. Harlow Treasurer.

California Central.—Dr. J. J. Ransom is appointed Chief Surgeon of this and the California Southern Railroad Co.

Canada Southern.—The following directors were elected this week: Cornelius Vanderbilt, William K. Vanderbilt, James Tillinghast, Anthony G. Dulman, Charles F. Cox, Samuel F. Barger, Siddey Dillon, Joseph E. Brown and Edward E. Wickes.

Chicago, Kansas & Texas.—The incorporators of this new Kansas company are A. L. Williams, P. P. Dillon, Charles Monroe and other Union Pacific officers.

Chicago, Kansas & Western.—Geo. L. Sands is appointed General Superintendent, with headquarters at Topeka, Kan.

Chicago, Rock Island & Pacific.—The election this week resulted as follows: David Dows, Francis H. Tows, James R. Cowing, Sidney Dillon, Roswell P. Flower, Benjamin Brewster, H. R. Bishop, and Henry M. Flagler, of New York; Hugh Riddle, H. H. Porter and Marshall Field, of Chicago; R. R. Cable, of Rock Island; George G. Wright, of Des Moines. The following officers were re-elected: R. R. Cable, President; David Dows and A. Kimball, Vice-Presidents; W. G. Purdy, Secretary and Treasurer. James R. Cowing was reappointed Assistant Secretary and Treasurer.

Cleveland, Columbus, Cincinnati & Indianapolis.—Assistant General Freight Agent White is transferred from Cleveland to St. Louis. A. B. Hough succeeds Mr. White.

Illinois Valley & Northern.—The incorporators of this new Illinois company are: Charles C. Upham, St. Paul, Minn.; Thomas C. Edward, O. K. Pittman and Frederick K. Copeland, Chicago, and John C. Osgood, Denver, Colo.

Junction City, Hope & McPherson.—The incorporators of this Kansas company are: Phillip Koch, N. Thurstin, W. P. Robinson, J. A Gillett and A. Heugeneut, of Dickinson County; F. G. Clark, F. B. Webster, J. A. Myers and Theodore Boggs, of McPherson County; R. Rockwell, A. C. Pierce, Milton E. Clark and C. W. N. Knight, of Junction City, Kan.

Kentucky Central.—The directors of this company, as reorganized, consist of M. E. Ingalls, Elliot H. Pendleton, H. E. Huntington, Samuel Thomas, C. S. Brice, Calvin Thomas and Geo. Brice.

Manchester & Lawrence.—The following have been elected directors: Hon. George B. Chandler and Hermann F. Shaw, of Manchester, N. H.; Hon. John W. Sanborn, of Wakefield; John A. Spalding, of Nashua; Elisha R. Brown, of Dover; William Fowler, of Boston; Col. Charles A. Sinclair, of Portsmouth. Col. Charles A. Sinclair, of Portsmouth, was elected President; Hon. S. N. Bell, of Manchester, Clerk; Henry Chandler, of Manchester, Treasurer.

Memphis & Charleston.—Henry Fink has been elected Vice-President, with office in New York. E. B. Thomas is appointed General Manager, office at Washington, D. C.

Meriden & Waterbury.—The directors of this new Connecticut company are: President, Charles Dickinson, of Waterbury; Vice-President, George R. Curtis, of Meriden; Secretary and Treasurer, George Rockwell, of Meriden; Assistant Treasurer, H. L. Wade, of Waterbury; Executive Committee, H. C. Wilcox, George R. Curtis, Samuel Dodd, Charles L. Rockwell and A. E. Chamberlain.

New Mexico & Arizona.—H. T. Richards has been appointed Superintendent, with headquarters at Benson, A. T., vice J. H. Scott, resigned.

Northern of New Hampshire.—At the annual meeting the old board was re-elected.

Peoria & Pekin Union.—James W. Hill has been appointed Master Mechanic of this road in place of R. F. Hurd, resigned. H. K. Pinkney has been appointed Treasurer vice R. A. Bunker, resigned.

Philadelphia & Reading.—C. M. Lawler has been appointed Superintendent of the Mahanoy Division, vice A. A. Hesser, assigned to other duty.

Rapid City, Wyoming & Western.—The directors of this new Dakota company are: Eugene B. Chapman, of Rapid City, Dak.; John C. Greene, of Omaha, Neb.; John H. Chapman, of Hannibal, Mo.; Adelbert Wilsie, John H. King, and Andrew J. Simmons, of Rapid City. E. B. Chapman is President.

Rome, Watertown & Ogdensburg.—Z. A. Emerson has been appointed General Traffic Manager.

St. Louis & San Francisco.—The directors have elected officers as follows: Edward F. Winslow, President; John O'Day, Vice-President; Henry L. Morrill, Second Vice-President; Thomas W. Little, Secretary and Treasurer, and George Butler, Assistant Treasurer.

Shreveport & Arkansas.—The first board of directors are: S. W. Fordyce, R. C. Keren, W. F. Homan, S. J. Zeigler, N. Gregg, W. B. Jacobs and Isaac Barron. S. W. Fordyce is President; S. J. Zeigler, Vice-President; Ed. Jacobs, Treasurer; and T. B. Chase, Secretary.

Sonora.—H. T. Richards has been appointed Assistant General Manager, with headquarters at Guaymas, Mex.

Vermont & Massachusetts.—The following directors were elected this week: Daniel S. Richardson, Lowell; William H. Hill, Brookline; Francis Goodhue, Brattleborough, Vt.; George F. Fay, Fitchburg; T. K. Ware, Fitchburg; Edward L. Davis, Worcester, and Alvah Crocker, Fitchburg, Mass.

Washington, Ohio & Western.—The following directors have been elected: Alfred Sully, T. M. Logan, J. H. Inman, C. S. Brice, E. Lehman, J. B. Pace, J. H. Dooley, R. T. Barton, H. Conrad, Hervey Hecton, M. McCormick and G. S. Scott. A. M. Martin has been re-elected President.

OLD AND NEW ROADS.

Aberdeen, Bismarck & Northwestern.—Arrangements have been completed for building the road from Ordway to Bismarck, D. T., the grading to be completed before Nov. 1.

Arkansas, Kansas & Colorado.—Incorporated in Kansas. The proposed road is to extend from Anthony, Harper County, northwestward through Dodge City, Ford County, to the western line of the state at or near where the Republican River crosses it, in Cheyenne County. Capital stock, $3,000,000. Office, Dodge City, Kan.

Atchison, Topeka & Santa Fe.—The company have filed articles of incorporation in Illinois for extending its line from Kansas City to Chicago. Capital stock, $10,000,000. Principal office, Chicago.

Black Diamond.—Work was begun on this road on May 28. The line is to be built from Parkersburg, W. Va., to Clifton Forge, connecting there with the Chesapeake & Ohio.

Boston & Maine.—The company will put mileage tickets on sale, beginning June 10, at the rate of 2 cents per mile. The tickets are not transferable.

Camden, Rockland & Rockport.—The survey has been commenced at Camden, Me. The road will pass through Rockport and Blackington's Corner, to a connection with the Knox & Lincoln.

Canadian Pacific.—The first steamship on the company's Japan and China line, the *Abyssinia*, left Yokohama on May 30 for Vancouver, B. C., with 2,500,000 pounds of tea, 63 bales of raw silk for overland transit, 21 cabin and 80 Chinese passengers. The steamships *Parthia* and *Batavia* will sail from Yokohama on June 19 and July 10 respectively.

The Dominion government has received advices to the effect that the company will expend from $1,500,000 to $2,000,000 on the mountain section of the line. The rock cuttings are to be widened so as to prevent their being filled with snow, and additional snow-sheds will be built wherever the storms of last winter showed them to be necessary.

The Dominion parliament has rejected the motion to suspend the policy of the Dominion government regarding the action of the Provincial Legislature of Manitoba in granting charters to railroads. This again defeats the projects rival to the Canadian Pacific interest.

The first train reached the ocean terminus at Vancouver, B. C., on May 24. Hitherto trains stopped at New Westminster.

Cape May & Sewell's Point.—It is reported that this road of 3¾ miles in New Jersey has been bought by Captain Cone for $60,000 and leased to Mayor Edmond, of Cape May, N. J., for $6,000 a year.

Central, of New Jersey.—The company has paid to the state of New Jersey this week $270,000, this being the full amount of tax for 1886.

Chicago & Alton.—The new rail and water route of this company between St. Louis and Eastern points only lasted four days, the New York, Lake Erie & Western, which was the eastern link of the combination, giving notice that it would not receive freight billed by this route after May 27.

Chicago, Kansas & Texas.—The company has filed a charter in Kansas. The proposed road leaves the Union Pacific at Abilene, Kan., runs thence through the southern tier of counties to the west line of the state. Another line to be constructed starts at Beatrice, Neb., and runs southwestwardly to Pratt Centre, Kan. Capital stock, $5,000,000.

Chicago & Northwestern.—The contract has been signed by which this company will at once proceed with the building of a bridge over the Missouri River at Sioux City, Ia.

Cincinnati, Hamilton & Dayton.—Henry S. Ives went to Indianapolis this week to offer W. H. McKeen $1,400,000 for a controlling interest in the Terre Haute & Indianapolis road. This road extends from Indianapolis to the Illinois state line, 79½ miles, has branches of 34½ miles, and leases the Terre Haute & Logansport, 183 miles, and the St. Louis, Vandalia & Terre Haute, 158 miles, giving a total length operated of 455 miles.

Cincinnati, New Orleans & Texas Pacific.—The line of through sleeping cars between Cincinnati, O., and Jacksonville, Fla., which was discontinued on May 1 for reasons of economy, has been re-established. It is the only sleeping car line between the two cities, and passes through Macon and Atlanta. It will run during the entire year.

Cleveland & Canton.—The company has filed its mortgage of $2,000,000 with the International Trust Co., of Boston. It is to secure funds for widening the gauge of the road and making other improvements.

Connecticut River.—The company has contracted with the Boston Bridge Co. for four iron bridges to replace wooden ones on the Ashuelot Division.

Dallas & Oak Cliff.—Proposals will be received till June 10, by W. J. Storms, Secretary, 709 Main street, Dallas, Tex., for the construction of this road, entire or in sections. As projected, the road extends from Dallas to a point at or near Forth Worth.

Danville & Seaboard.—A charter has been obtained for this company. The line will probably be built from Danville to Henderson, N. C., there to connect with the Seaboard & Roanoke.

Dayton & Ironton.—The road has been consolidated with the Dayton & Chicago. The Ives-Staynor syndicate, controlling the Dayton & Ironton, bought the holdings of the minority stockholders, thus disposing of the injunction suit recently brought, and which prevented the consolidation. The Dayton & Chicago will be changed from narrow to standard gauge, and the consolidated road will be known as the Dayton, Fort Wayne & Chicago.

Delaware & Hudson Canal.—All the collieries in the neighborhood of Wilkesbarre, Pa., are idle this week. No official reasons are given for the suspension.

Duluth, Huron & Denver.—It is reported that contracts have been made for rails and ties, and for locomotives and other equipment, and that work is to begin, and will be vigorously pushed. The company was organized in March of last year to build a road from Duluth, Minn., to Huron, Dak., with a possible extension to Denver, Col. It is now expected that 92 miles from Sauk Centre, Minn., to the Dakota line will be completed by Jan. 1, 1888, and another division from Sauk Centre to Duluth the following year.

Fitchburg.—The two new acquisitions to this system—the Troy & Boston, and the Boston, Hoosac Tunnel & Western—give the company a line to the Hudson and Mohawk rivers, which is, by reason of the two newly-acquired roads being parallel to each other for much of the distance, practically double-tracked to Johnsonville, N. Y., 17 miles east of the Hudson. In putting the two roads together for operation as a double track line, several improvements in alignment and station arrangements will be made. Division Superintendent Crandell is to have charge of both lines, and C. A. Nimmo, lately General Passenger Agent of the Troy & Boston, will have charge of the passenger business.

Fort Worth & Rio Grande.—Twenty-eight miles of track have been laid from Fort Worth, Tex., on this road, and the road is graded to Granbury, in Hood County.

Freeport, Dodgeville & Northern.—This company, which was incorporated last week, has already started a preliminary survey from a point about 8 miles north of Freeport, Ill. The line is to run northwest to Dodgeville, 58 miles. The survey is in charge of W. F. Sargent, of Chicago.

Gainesville, Pilot Point & Western.—This company has obtained a charter in Texas for a road to extend from McKinney, in Collin County, via Pilot Point to Gainesville. It is intended to give the Houston & Texas Central an outlet north and east over the Atchison, Topeka & Santa Fe.

Illinois Valley & Northern.—Incorporated in Illinois to build a road from a point on the Mendota & Clinton branch of the Chicago, Burlington & Quincy at or near the town of Walnut, Bureau County, in a southeasterly direction through Bureau and La Salle counties to a connection with the Aurora & Streator branch of the Chicago, Burlington & Quincy within or near the city of Streator. Capital, $1,500,000. Office, La Salle, Ill.

Junction City, Hope & McPherson Air Line.—Incorporated in Kansas. The road is projected to run from Junction City, Davis County, via Hope, Dickinson County, to McPherson, and from there southward to the state line.

Kaskaskia, St. Elmo & Southern.—The company is now building between Paducah, Ky., and Altamont, Ill., and has about 30 miles of road graded. The rails will be laid this summer. Johnston & Faught, of St. Elmo, Ill., have the contract for tracklaying.

Kentucky Central.—This company, as reorganized, filed articles of incorporation in Kentucky on May 27. The capital stock is placed at $7,000,000, and Covington is the principal office. The incorporators are C. P. Huntington, Eli C. Baldwin and George Bliss.

Louisville Southern.—It is stated that this road, building from Louisville, Ky., to a connection with the Cincinnati, New Orleans & Texas Pacific, 84 miles, will be completed by the end of the present year. About 1,000 men are now at work.

Manchester & Augusta.—Chief Engineer F. Gardner advertises for bids on 20 miles of grading to be done between Sumter Court-House and the Santee River, N. C.. Address, care of Wilmington & Weldon Railroad Co., Wilmington, N. C.

Mineral Belt.—Forty miles of the road from Flagstaff, Arizona, are located, and 16 miles of track are completed. At the present rate of work, the road will be built to Globe within 14 months.

Mobile & Birmingham.—The contract for the 45-mile gap between Marion Junction and Choctaw Corner on this road, in Alabama, has been let to J. L. McLane, of Michigan, work to be completed Oct. 15. Tracklaying is to begin at once on the 35-mile section above the Tombigbee River. It is rumored that the Mobile & Dauphin Island will be a continuation of this line. The Dauphin Island road is now building. From the main land to the island there will be 2½ miles of trestle with several drawbridges. Cresoted timber will be used in this construction.

New Haven & Derby.—The New York, New Haven & Hartford has offered $300,000 for the city of New Haven's interest in this road. If the city will not sell, the New York, New Haven & Hartford propose that the entire debts of the Derby road be funded and that the road then be leased to the New Haven for 99 years on the same terms as those of the Naugatuck railroad lease.

New York & Boston Rapid Transit.—The project for a railroad between New York and Boston, 30 or 40 miles shorter than existing lines, and to run trains at very high speed over a perfect roadbed, which has been periodically announced for several years past, appeared last week under the above title, a company with this name filing maps and plans in New York City. There seems to be nothing of consequence that is new except that the location in New York City is quite definitely described, the terminal point being at Eighth avenue and 59th street, from which a line is described northward on the west side of the city to about 155th street, where it crosses the Harlem River and runs toward Port Chester. The feasibility of a competing line between these two cities, depends, of course, wholly upon the cost of right of way at the terminals, and on this no light is given.

New York, Chicago & St. Louis.—The Supreme Court at Buffalo, N. Y., has ordered a judgment for $282,583 in the suit of H. B. Hollins against William K. Vanderbilt and others, as trustees of this company.

New York, New Haven & Hartford.—This company's lease of the Naugatuck road is for 99 years at $200,000 a year, beginning on the 1st of April of this year. The lease covers the Watertown & Waterbury road and all the Naugatuck's property, rights and privileges. The Naugatuck agrees to maintain its corporate organization, but the New York, New Haven & Hartford will disburse dividends and interest. Provision is made for the issue of new bonds and an increase of capital stock, provided that the $200,000 a year rental is not increased.

It is reported that a contract has been concluded with the Union Switch & Signal Co. for apparatus to equip the New York division with block signals.

New York, Woodhaven & Rockaway.—The road is announced to be sold under foreclosure on June 28.

Northern Pacific.—The Oregon Transcontinental has filed complaint against this company. The complainant owns about one-sixth of the Northern Pacific stock, and seeks to prevent the latter from issuing bonds or taking control of a branch road known as the Spokane & Palouse, a road projected in the Washington Territory by stockholders of the Northern Pacific in 1885. An injunction is asked for to prevent the Northern Pacific from exercising any control in regard to the branch road. The Oregon Transcontinental does not wish the road to be built, as it would conflict with its interests.

The Mullen tunnel on this road, near Butte, Mont., caved in on May 28 for 100 ft., and the transfer of freight will be stopped for some time to come.

The people of Washington Territory propose to celebrate the completion of the Cascade Division of this road on July 4

Pacific.—The Commission has continued taking testimony during the past week in its investigation of Union Pacific affairs. Governor Ames of Massachusets, Judge Dillon, Elisha Atkins and General E. P. Alexander have been examined.

Peekskill Valley.—Incorporated at Albany, N. Y. The road to be built will extend from Peekskill to Brewsters, about 20 miles.

Pendleton & Wallula.—G. W. Hunt has received a contract for building the road between Pendleton and Wallula, Wash. Ter., 35 miles, with a branch to Centreville, 15 miles. There will be one bridge on the line, to cross the Walla Walla River. The names of the owners of the road have not been made public. It will connect with the Northern Pacific.

Philadelphia & Reading.—The suit of the conductors against the company for withheld wages is to be discontinued. The management has effected an arrangement to pay the conductors in cash upon the assignment of their claims prior to Dec. 1, 1883.

Rapid City, Wyoming & Western.—Articles of incorporation filed in Dakota. The line is surveyed 17 miles west of Rapid City, and the location has commenced. The line will run westward in Creek County, Wy., and through Fall River, Custer, Pennington, Lawrence and Butte counties, Dak., penetrating the Black Hills region. Capital stock of the company, $1,000,000. Headquarters, Rapid City, Dak.

St. Joseph Circle.—Incorporated in St. Joseph, Mo., to build a standard gauge road within and around St. Joseph, 20 miles in length. Capital stock, $450,000.

St. Louis, Fort Scott & Wichita.—The road was recently sold under foreclosure at Topeka, Kan. It was bought in by B. P. Waggener, General Attorney of the Missouri Pacific, for $5,488,000, which was the amount of the first mortgage and accumulated interest. The St. Louis, Fort Scott & Wichita system embraces 310 miles of road running from Fort Scott to Eldorado, Kan., and having branches to Anthony and McPherson, Kan. It was built in 1880, and when about half completed the Missouri Pacific took the management of it. There is a second mortgage outstanding of $1,500,000, owned by the Missouri Pacific. There are also large judgments against the company, and a large amount of stock held by the municipalities along the line, all of which will be wiped out by the sale. Stockholders and creditors will probably commence litigation.

St. Louis & Western.—This road, which is the old Laclede & Fort Scott, has been sold under foreclosure for $30,000. It is understood that the road was bought in the interest of the St. Louis & San Francisco.

St. Paul, Minneapolis & Manitoba.—It is stated that this company, in extending its lines from Crookston to Brainerd, Minn., and thence to Duluth, Minn., and its St. Cloud and Hickler branches to Duluth, will meet the Duluth, South Shore & Atlantic at that point and run over a common road with the latter line to Sault Ste. Marie.

The U. S. Interior Department has approved the right of way of this company through a 177-mile portion of the Blackfeet Indian Reservation. The number of acres required is 3,508, with an appraised value of 50 cents an acre.

The road is completed between Rutland and Ellendale, D. T., 49 miles, and regular trains were put on May 30.

Sheffield & Birmingham.—The road had been sold to English capitalists. The track is laid 30 miles from Sheffield, Ala., and trains are running daily for 18 miles. A section of 50 miles is ready for the rails, and 50 miles more are yet to be contracted for.

Shreveport & Arkansas.—The company has organized at Shreveport, La., with capital of $500,000, and will build a road from Shreveport to the Arkansas line. It is to connect at Louisville, Ark., with the St. Louis, Arkansas & Texas. President Fordyce, of the latter company, has closed a contract with the city of Shreveport providing for the building of the road by his company, and bids for construction will soon be invited.

Southern Pacific.—The Mexican extension of line from Eagle Pass, Tex., known as the Ferro Carril International, is building to a connection with the Mexican Central at Lerdo or Terranna, Mex.

Tennessee Midland.—This company, which was incorporated in January last, proposes to construct a road from Memphis, Tenn., to a point on the Virginia state line at or near the crossing of Clinch River, with branch roads to Columbia and Bristol, Tenn. The total mileage will be 575 miles, traversing from southwest to northeast the best agricultural, timber, marble and mineral region in Tennessee, and connecting by an air line Memphis, Nashville and Knoxville. The engineers are now preparing to survey the line from Knoxville. Seven engineering parties are now in the field between Memphis and the Cincinnati Southern road, and the road from Memphis to Nashville has been definitely determined upon.

Toledo, Columbus & Southern.—The Attorney-General of Ohio has filed a case in the Supreme Court against Theophilus Brown and others, of Toledo, O., and Stevenson Burke, of Cleveland, shareholders and alleged owners of the railroad. The petition is in *quo warranto*, and states that the defendants are exercising, without legal authority, the rights and privileges of a railroad company. It is alleged that subscribers have failed to make their payments on the stock, and show no disposition to do so. The road is a short line running between Toledo and Findlay, O., 41 miles. The suit is brought at the instance of Aaron F. Perry, of Cincinnati.

Wabash Railway.—Suit for $2,000,000 has been filed against this company in St. Louis, Mo., Chicago and Springfield, Ill., by the New York and Pacific Car Trust Association. The claim is based on rentals and installments due on equipment and use of rolling stock.

Receiver McNulta has paid $400,000 interest on the mortgage bonds held against the road. It is the first money paid on the road's indebtedness for years, and comes from the earnings under the receivers appointed by Judge Gresham.

Wisconsin Central.—The company is to locate its shops in North St. Paul, Minn. It will erect buildings to cost $200,000, and 1,000 men will be employed.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Month of April:	1887.	1886.	Inc. or Dec.	P. c.
Cen. of Georgia..	$387,596	$403,335	D. $15,739	3.9
Net earnings....	57,893	37,017	I. 20,876	62.0
Cleve. & Canton..	33,052	27,336	I. 5,616	20.5
Net earnings....	9,855	5,563	I. 3,292	58.7
Det., B. C & Al..	32,987	.....	.....	....
Net earnings....	14,759	.....	.....	....
Ft. W. & Den. C.	55,564	34,147	I. 21,417	62.8
Net earnings....	20,336	14,372	I. 5 964	41.4
N. Y., L. E. & W.	1,868,122	1,741,356	I. 126.766	7.3
Net earnings....	508,248	466.933	I. 41,315	8.8
Penn. & Ohio.....	492,481	474,490	I. 17,991	3.7
Net earnings....	144.184	146,469	D. 1.285	.9
Phila. & Reading	1,751,844	1,359,315	I. 392.529	28.8
Net earnings....	914,668	408,242	I. 506.336	124.0
Coal and Iron...	1,204,578	1.093,605	I. 110,973	10.1
Net earnings..	34,240	*223,405	I. 257,655	....
Total (gross).....	$5,793,137	$5,133,584	I. $659,553	12.8
Total (net).....	1,689,334	855,191	I. 834,143	97.5
Four months—Jan. 1 to April. 30:				
Buff.. N. Y. & P..	$822,778	$763,754	I. $62.024	8.1
Net earnings...	74 956	130,129	D. 55,173	42 4
Cen. of Georgia...	.....	.....	.....	....
Net earnings....	635,700	475.925	I. 159,784	33.5
Chi., St. L & P...	1,758,188	1,427.961	I. 330,227	23 1
Net earnings....	397,680	173,896	I. 223,784	128.6
Cleve. & Canton..	111,072	98,505	I. 12,567	12.7
Net earnings ..	22,068	16,913	I. 5,155	30.5
Det., B. C & Al..	123,235	. . ....	.....	....
Net earnings .	61,848	.....	.....	....
Ft. W. & Den. C.	192,197	108.362	I. 83,835	77.3
Net earnings....	76,031	38,247	I. 37,784	98.9
Manhattan Elev..	2.655,022	1,419,044	I. 1,235,978	87.1
Net earnings....	1,095.001	1,140,306	D. 45,305	3.9
Nash., C. & Tenn.	900,008	746,333	I. 229,675	31.4
Net earnings...	408,083	280,708	I. 127,375	45.3
N. Y., L. E. & W.	7,280,777	6,617,667	I. 663,110	10.0
Net earnings ...	1,908,499	1,521,183	I. 387,286	23.4
Pennsylvania.....	16,593,826	14,735,483	I. 1,858.343	12.6
Net earnings....	5,381,232	4,845,789	I. 435,543	8.9
Total (gross)....	$30,373,868	$25,898 109	I. $4,475,759	17.2
Total (net).....	9,363,620	8,247,171	I. 1,116,449	13.5
Seven months—Oct. 1 to April 30:	1886-87.	1885-86.		
N. Y., L. E. & W.	$13.549,297	$12,383.727	I. $1,165,570	9.4
Net earnings....	3,880,637	3,420,925	I. 459,712	13.4
Six months—Nov. 1 to April 30:				
Central of Ga.....	$4,703.600	$4,539,683	I. $163,917	3.6
Net earnings...	1,910,629	1,761,065	I. 149,564	8.4
Ft. W. & Den. C..	>90,923	185,237	I. 105,686	57.0
Net earnings...	130,147	63,059	I. 67,088	106.3

* Deficit.

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

The Inter-state Commission.

The Associated Wholesale Grocers, of St. Louis, Mo., have entered complaint before the Commission, charging discrimination against the Missouri Pacific. It is alleged that a conspiracy exists between this and other lines by which shippers outside of the state are charged less for transportation for points within the state than is charged Missouri shippers for transportation between the same points. It is also charged that car-load rates from St. Louis and other points are more than 25 per cent. less than the same merchandise in less than car-load quantities.

William H. Council, a colored citizen of Mobile, Ala., has placed a petition before the Commission, in which it is stated that he has been a subject of unjust discrimination at the hands of the Georgia Central Railroad Co., by being required, while traveling between the states, to accept second-class accommodations when he had paid first-class fare.

The New York, Ontario & Western has made a general denial of the complaint made against it that the rates charged for the transportation of milk from Orange County to Jersey City are unreasonable ; and, furthermore, denies that it gives any special rate to any shipper of milk.

East-Bound Shipments.

The total shipments of all freight except live stock from Chicago through to seaboard points by all lines except the Chicago & Atlantic amounted last week to 28,321 tons, against 28,579 tons for the week previous. The percentages of each road were: Baltimore & Ohio, 15.3; Chicago & Grand Trunk, 11.7; Pittsburgh, Cincinnati & St. Louis, 10.6; Lake Shore & Michigan Southern, 15.3; Michigan Central, 15.7; New York, Chicago & St. Louis, 7.8; Pittsburgh, Fort Wayne & Chicago, 21.3; Cincinnati, Indianapolis, St. Louis & Chicago, 2.3.

Cotton.

The cotton movement for the week ending May 27 is reported as below, in bales :

Interior markets :	1887.	1886.	Inc. or Dec.	P. c.
Receipts.....	4 548	15,085	D. 10,537	69.8
Shipments..... ...	10.828	32,889	D. 22,061	67.1
Stock.....	58,583	156,692	D. 98,104	62.6
Seaports :				
Receipts.	9,765	22.790	D. 13,025	57.1
Exports	13,986	46,674	D. 32,688	70 0
Stock....	559,389	565,777	D. 206,388	36.4

The total movement from plantations for the crop year ending May 27 was 6,260,615 bales, against 6,327,294 last year, 5,559,671 in 1884-85, and 5,577,406 in 1883-84.

Coal.

Coal tonnages for the week ending May 28 are reported as follows :

	1887.	1886.	Inc. or Dec.	P.c.
Anthracite.....	586,492	419,676	I. 166 826	39.7
Bituminous.....	262,9 .7	170,954	I. 91,983	53.8
Coke (May 21).....	11,681	85,337	D. 73,656	86.3

Cumberland coal shipments for the week ending May 28 were 64,429 tons, and for the year to that date 1,246,844 tons, an increase of 788,350 tons as compared with the corresponding period last year.

The coal tonnage of the Pennsylvania road for the week ending May 21 is reported as follows :

	Coal.	Coke.	Total.	1886.
Line of road...	194,761	11,681	206,442	191,812
From other lines.....	.....	.... ..	.. ...	90,738
Total..... ..	194.761	11,681	206,442	282.550
Year to May 21.....	4,003,109	1,523,831	5,526,940	5,476,459

Thousand-mile Tickets

The New York, Lake Erie & Western has placed 1,000-mile tickets on sale at $20 each, limited to one year from date of purchase.

St. Paul-Chicago Grain Rates.

The expected demoralization of through rates between Chicago, Minneapolis and St. Paul has been averted. The Chicago, Burlington & Quincy has compelled its controlled line, the Chicago, Burlington & Northern, to agree to the regular rates. The latter company had announced its intention to withdraw from the Northwestern Association on June 1, and to reduce grain and flour rates 50 per cent. The Chicago, Milwaukee & St. Paul threatened to retaliate by cutting rates between Chicago and Omaha, where the conditions are in a measure reversed, the St. Paul road having much less local traffic than the Burlington, so that it could injure the latter's business with somewhat the same impunity that the Burlington can ignore local business in the northwest; but at a meeting in Chicago, May 31, the Burlington agreed to continue the tariff rates, and to observe the rule requiring 15 days' notice of any change.

The Paris Exposition.

The Executive Committee of the International Exposition of Railway Appliances and Industries solicit the loan of any objects, books, medals, drawings, etc., relating to the history of railroads and transportation generally, both ancient and modern, in this country. Expenses of forwarding and returning same will be defrayed by the committee, and insured for the value that the lender may put upon each object. Communications may be addressed to M. G. Senechal, 8 Faubourg Montmartre, Paris, or to George L. Fowler, M. E., Commissioner in charge for the U. S., Palais de L'Exposition, Bois de Vincenne, Paris, France.

Meeting Freight Rates.

The Chesapeake & Ohio announces that it has made freight rates from East St. Louis, Ill., to the Atlantic seaboard the same as are now made by the trunk lines from Chicago.

Coal Prices

The June circular of the Philadelphia & Reading Coal and Iron Co. bases prices upon the new regulation, which makes a uniform rate of lateral tolls of 30 cents, and compels the consignee to pay these from the mines instead of from shipping points, as heretofore. The rates for hard white ash coal at the mines will be $2.45 for lump; steamboat, broken and egg, $2.70; stove and small stove, $2.45; $1.35 for pea and $1.10 for buckwheat.

Transcontinental Rates.

The Canadian Pacific has made a rate of 75 cents per 100 lbs. on barley and beans from San Francisco to Omaha, Kansas City and other Missouri River points. American transcontinental rates are 88 cents.

Special Rates on Farm Tools.

The Chicago, Rock Island & Pacific has established a regulation that will be greatly appreciated by persons living along their line. Agricultural implements, machinery and vehicles returned to factories for repairs will be transported at one-half tariff rates if they were originally shipped over that road.

Flour and Grain Receipts.

The receipts of flour at Buffalo during the month of May, compared with the receipts for the corresponding month in 1886, show a decrease of 113,126 barrels. In wheat there is a decrease of 79,328 bushels, in corn an increase of 1,242,084 bushels, in oats an increase of 418,760 bushels, in barely a decrease of 62,027 bushels, and in rye a decrease of 46,000 bushels. The total increase for the month in all kinds of grain is 1,473,489 bushels, and in all grain, flour reduced to wheat, 907,859 bushels. Compared with last season the receipts to June 1 show a decrease of 176,541 barrels of flour, in the total grain an increase of 375,678 bushels, and in all grain, flour reduced to wheat, a decrease of 516,030 bushels.